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WHOLE No. 2,449.] NEW YORK, APRIL, 1883. [VOLUME LVII.—No. 1.

ORGANIZATION.

AT a meeting of the directors of the Pittsburgh and Grafton Railroad Company, held at Wheeling, W. Va., on the 13th inst., the following officers were elected: James H. Hopkins, of Pittsburgh, president; Henry M. Mathews, of Greenbrier, vice-president; Joseph S. Miller, treasurer; Randolph Stalnaker, secretary, and Jno. W. Mason, of Grafton, attorney. The intention is to construct a standard-gauge steel railroad from Pittsburgh to Grafton. It is expected to consolidate with the Grafton and Greenbrier Railroad, thus giving an air-line road from Pittsburgh to intersect the Chesapeake and Ohio at or near White Sulphur Springs.

AT a meeting of the stockholders of the New Orleans, Baton Rouge and Meridian Railroad Company, held at Vicksburg, Miss., on the 9th inst., the following directors were elected: R. T. Wilson, John H. Ingraham, John A. Grant, J. M. Edwards, R. H. Elliott, C. E. Armstrong, W. S. Matthews. The following officers were elected by the directors: R. T. Wilson, president; J. M. Edwards, vice-president, general manager and treasurer; John A. Grant, chief engineer; C. E. Armstrong, secretary and assistant treasurer.

AT the annual meeting of the stockholders of the New York Central and Hudson River Railroad Company, held in Albany, N. Y., on the 18th inst., William H. Vanderbilt, Cornelius Vanderbilt, William K. Vanderbilt, Frederick W. Vanderbilt, Augustus Schell, Samuel F. Barger, Chauncey M. Depew, James H. Rutter, J. Pierpont Morgan, Cyrus W. Field, of New York; Chester W. Chapin, of Springfield, Mass.; John Allen, Jr., of Buffalo; James M. Marvin, of Saratoga Springs, were elected directors for the ensuing year.

AT the monthly meeting of the New England General Passenger and Ticket Agents, held in Boston on the 18th inst., the following officers were elected: J. F. Liscomb, of the Portland Steam Packet Company, president; Walter Pearce, of the Connecticut Western Railroad, vice-president; C. A. Waite, of the Worcester and Nashua Railroad, secretary. The principal business transacted was the arranging of excursion rates between Boston and New York the coming summer.

THE directors of the Panama Railroad Company, elected on the 9th inst., are: J. G. McCullough, R. W. Thompson, Jesse Seligman, E. P. Fabbri, J. W. Ellis, Theo. J. De Sabla, D. O. Mills, Charles G. Francklyn, Joseph Ogden, Wm. B. Dinsmore, Thomas Maddock, Geo. Gare and E. F. Winslow. The officers are: J. G. McCullough, president; R. W. Thompson, vice-president; E. Z. Penfield, secretary and treasurer.

THE officers and directors of the Railroad Safety Lock and Signal Company, elected on the 11th inst., are: J. H. Michener, president; Samuel M. Plush, M. D., vice-president; E. F. McKean, secretary; George B. Dresher, treasurer. J. H. Michener, S. M. Plush, M. D., W. M. Huey, W. C. Shaffer and George B. Dresher, directors. W. C. Shaffer, general manager.

THE directors of the Pensacola and Atlantic Railroad Company, elected at Pensacola, Florida, on the 11th inst., are: M. H. Smith, John E. Green, W. F. McCormick, G. A. Stanley and W. D. Chipley. M. H. Smith, of Louisville, Ky., was chosen president, W. D. Chipley, vice-president and general superintendent, and C. Quarrier, secretary and treasurer.

AT the annual meeting of the stockholders of the Long Island Railroad Company, held on the 10th inst., the following directors were elected for the ensuing year: Austin Corbin, J. Rogers Maxwell, Henry Graves, James G. K. Duer, Edward Tuck, J. P. Townsend, A. Sully, Demas Barnes, F. B. Wallace, F. W. Peck, Henry W. Maxwell and Daniel C. Corbin.

THE following gentlemen have been elected directors of the Long Island City and Flushing Railroad Co.: Austin Corbin, J. Rogers Maxwell, Henry Graves, Henry W. Maxwell, Alfred Sully, Edward E. Sprague, Frederick W. Dunton, Charles Knoblauch, Gilman S. Moulton, William G. Wheeler, Carl Victor, Thomas F. Ward, E. B. Hinsdale.

INCORPORATION.

THE North Carolina, Cleveland and Chattanooga Railroad Company has been incorporated in Tennessee to build a road from a point in Polk county, on the North Carolina line, between the nearest point to the Hiawassee River and the Georgia line, connecting with the Western North Carolina Railroad, or its extension, passing then through Polk and Bradley counties, through Cleveland, Tenn., crossing the East Tennessee, Virginia and Georgia Railroad, thence through James and Hamilton counties to Chattanooga, crossing the Cincinnati Southern at or near Boyce station.

THE Allegheny and Western Railroad Company was chartered at Harrisburg, Penn., on the 14th inst. The line begins at a point on the West Penn and Shenango Railroad, about six miles north of Butler, and runs to East Brady, in Clarion County; length, twenty miles. The capital stock is $500,000. President, B. K. Jamison, Philadelphia. Directors, J. Henry Kershaw, Philadelphia; William Waugh, J. T. Blair, Greenville; A. H. Steele, Titusville; Arnold G. Plummer and W. R. Meredith, Philadelphia.

A CHARTER was granted at Harrisburg, Penn., on the 17th inst. to the Pittsburgh, Allegheny and Chicago Railroad Company. The road is to run from Pittsburgh to the boundary line of Ohio through the counties of Allegheny and Beaver, a distance of

forty miles. The capital will be $200,000, and the headquarters of the company will be in Pittsburgh.

THE Sinnemahoning and Sheffield Railroad Company has been chartered at Harrisburg, Penn., with a capital stock of $390,000; it is to be sixty-five miles long, and will run from between the counties of Cameron and Elk, at Bennett's Branch of Sinnemahoning Creek, to Sheffield in Warren county.

THE Lake Superior, Willmar and Dakota Railway Company has been incorporated with a capital of $1,250,000. The road is to run from some point on the Northern Pacific near St. Cloud, through Willmar and Granite Falls to the west line of Minnesota, with a branch into Lac-qu-Parle county.

THE Paramore Railroad Company have secured a charter for a line between Clarendon, on the White River, to Hot Springs, Ark., by way of Little Rock.

CONSTRUCTION.

THE Sioux City and Pacific Railroad has recently been opened for business to Valentine, Neb., four miles west of Fort Niobrara, thirty miles south of Rosebud Agency, 119 miles east of Pine Ridge Agency, and 186 east of Rapid City, in the Black Hills. The Elkhorn Valley Line, starting from Missouri Valley, where it intersects the Chicago and Northwestern Railway, runs westward, crossing the Missouri River at Blair, intersects the Union Pacific Railroad at Fremont, cutting off thirty-three miles between Chicago and Fremont; thence up the Elkhorn Valley to its source, and thence across 100 miles of free Government land, open to homesteading and pre-empting.

THE contract for the construction of a railroad from Carlisle, Penn., to Gettysburg has been awarded to Keller & Bush, of Lancaster. The new road is to be known as the Harrisburg and Gettysburg Railroad, running from Gettysburg to Hunter's Run, where it will make connection with the South Mountain Railroad, and run to the South Mountain Junction, where it will again connect with the Cumberland Valley Railroad, and run through to Harrisburg. The contract calls for the completion of the road by the 1st of September. The Carlisle Manufacturing Company has been awarded the contract for building eight construction cars for the new road.

THE directors of the Southern Maryland Railroad have concluded a contract with Charles H. Middleton, of Philadelphia, for completing and equipping the road to Point Lookout, on the Potomac, and Drum bay, on the Chesapeake. The main line of the road runs from the District of Columbia through Prince George's, Charles and St. Mary's counties to Point Lookout. From Mechanicsville, in St. Mary's county, a branch road will be built to Drum Bay, giving a terminus at deep water on the Chesapeake. The road is to be completed to the latter point within one year and to Point Lookout within two years.

THE contracts for the construction of the Philadelphia, Germantown and Chestnut Hill Railroad have been let. The seven miles have been divided into nine sections, in order that the work may be completed as soon as possible. The work has been awarded as follows: First and second sections to Smith & McGraw; third and fourth sections to McLaughlin & Riley; fifth section to Condon Brothers; sixth section to E. D. Smith; seventh section to E. J. Gaynor, and eighth and ninth sections to Costigan & Thayer.

THE Eastern Ohio Railroad, which has been for a number of years in operation from Cumberland, Ohio, eastward eight miles to Point Pleasant, on the Cleveland and Marietta Railroad, has recently been purchased by the Cincinnati, Wheeling and New York Railroad Company. The new company has extended the road from Point Pleasant east to Senecaville, five miles, making it thirteen miles long.

THE Asheville and Spartanburg Railroad Company propose to commence at once the construction and equipment of the unfinished portion of their road between Henderson and Asheville, N. C., a mortgage for $500,000 having been executed for that purpose. The work will be completed in two months. This, it is said, is the "missing link" between the South Atlantic coast and the Northwest.

GROUND was broken on the 16th inst. at Mount Blanchard, Hancock county, Ohio, for a section of eleven miles of the Cleveland, Delphos and St. Louis narrow-gauge Railroad, which will complete the line to Cary, in Wyandot county, joining the Indiana, Bloomington and Western, and Columbus, Hocking Valley and Toledo railroads.

A NARROW-GAUGE Railroad has recently been completed by the Rogers Lumber Company from Seney, Ga., on the East Tennessee, Virginia and Georgia road, thirteen miles south of Rome, south by west to Deaton, on the East and West road. It is nine miles long, and was built chiefly for carrying lumber, but passenger trains are also run on a regular schedule.

PROPOSALS for the grading and masonry of the extension of the Bangor and Piscataquis Railroad from Blanchard to Moosehead Lake, 14 miles, will be received up to May 10th, 12 o'clock, M., at the office of said Company in Bangor, Me., where the profiles, plans and specifications of the required work may be examined. Moses Giddings is president of the company.

SURVEYS have been made for a branch of the New York and New England Railroad about five miles long from the Providence Division, near Baltic, Conn., southeast to the Norwich and Worcester Division at Taftville. It will accommodate several large mills and will shorten considerably the distance between Hartford and Norwich.

A SURVEY of the route of the Warrior Coal Fields Railroad will soon be commenced. The road is to run from Meridian, Miss., to Gainesville, Ala., and thence to Decatur, a total length of 200 miles. The road will traverse the greatest width of the Warrior coal fields, which are from 5,000 to 6,000 square miles in extent.

THE last spike was driven on the 11th inst. at the Tennessee and Kentucky State line connecting the KNOXVILLE branch of the Louisville and Nashville Railroad with the East Tennessee, Virginia and Georgia Railroad. This makes a direct line from Knoxville to Louisville, 260 miles.

THE building of the branch railroad from the New York, New Haven and Hartford depot in New Haven to Savin Rock will probably be completed by the last of August. The estimated cost of the road, which will be nearly three miles in length, is $50,000.

THE Cincinnati and Eastern Railroad has been completed and opened to Evans, Ohio, three miles beyond the late terminus at Mineral Springs, and eighty miles from Cincinnati. Track-laying is in progress between Evans and Galena.

WORK will be resumed this month on the extension of the Northeastern, of Georgia, Railroad from Tallulah Falls, Ga., to Rabun Gap, and about the same time work will be begun on the section of the road in North Carolina.

THE Woodland *Democrat* says it is now almost an assured fact that the Central Pacific Railroad Company will build a road from Vacaville through Berryessa Valley into Lake county. Lakeport, the county seat, is to be the terminus.

TRACK on the Wisconsin, Iowa and Nebraska has been laid to a point six miles northeast of Gladbrook and twenty-eight miles beyond Marshalltown, and grading is done to Waterloo, about thirty miles beyond Gladbrook.

THE New Iberia (La.) *Sugar Bowl* says that as soon as the road from New Iberia to the salt mines is completed, work will commence on a line connecting New Iberia with Abbeville, a distance of twenty miles.

THE managers of the Des Moines, Osceola and Southern Rail-

way have decided to put under contract sixty miles of road from the present terminal point, to be built at once. This will carry the road into Missouri.

THE contract for the building of the Chicago, Springfield and St. Louis Railway between Springfield and St. Louis has been let, and a large force is now at work between Litchfield and St. Louis.

THE contractors for the grading of the Ontario and Quebec Railway in the vicinity of Toronto have been instructed to prepare at once for track-laying between Carleton Junction and that city.

GROUND was broken on the 18th inst. at Gettysburg, Penn., for the Gettysburg and Harrisburg Railroad, "amid the firing of cannon, ringing of church bells and cheers of the people."

THE grading on the St. Johns and Lake Eustis Railroad will be completed to Tavares, Florida, by the 1st of May.

THE Southern Pacific Railroad Company is now putting down fifty car loads of steel rails on the Santa Ana branch.

THE Toledo and Indianapolis Railroad was opened for regular trains between Toledo and Findlay on the 14th inst.

WORK is progressing rapidly on the New Orleans and Mississippi Valley Railroad road-bed below Baton Rouge.

WORK on the Gatineau Valley (Canada) Railway will commence the first week in May.

Phosphor-Bronze.

PHOSPHOR-BRONZE, a substance manufactured by the Phosphor-Bronze Smelting Co., No. 512 Arch street, Philadelphia, Penn., is being extensively used in locomotives, passenger and freight cars, marine and stationary engines, rolling-mills and miscellaneous machinery in the form of Phosphor-Bronze S" bearing metal. It is applied to bearings, slide valves, cross-head gibs, piston rings, bushings, steam connections, etc., with a large and extending recognition of its extraordinary value in these applications. It has been in use about ten years.

The manufacturers claim for it all qualities necessary for a good bearing metal, including greater durability than any other metal employed in this way, and less wear upon journals and axles. Friction and heating are reduced to a minimum, and if from over pressure or want of lubrication the bearing becomes hot, it will not cut the journal. The loss in re-melting the ingot is found to be slight—much less than with brass. As to the all-important consideration of cost, it has been found, on some of the leading railroads of the country, that its durability and excellent service in every way more than compensate for its slightly higher price than that of ordinary gun metal or composition.

Phosphor-Bronze S" bearing metal is furnished to consumers either in ingots or castings. Instructions for handling the alloy are given with the first order, and any competent founder can make good work.

We learn that Phosphor-Bronze has been found a trustworthy and superior substance in the form of telephone wire, resisting corrosion, having four times its weight per mile in tensile strength, being light and thus well adapted for long spans and small in size, and having a resistance, found by actual experiment made by WM. W. D. SARGENT, electrical engineer, only about one-half that of iron wire of eqaal weight.

We recommend railway men and others interested in using a cheap and trustworthy alloy for the purpose briefly indicated, to write the manufacturers for further information.

IT is proposed to lay a cable from Portugal to the Azores Islands, thence to the Bermuda Islands and thence to Havana; also a cable from Bermuda to New York and a cable connecting Havana with the Central AmericanTelegraph lines. By the new project the cost of messages from Spain to Havana will be reduced from $1.20 per word to 30 cents.

Commerce of New York.

THE foreign imports at New York in March were:—

	1881.	1882.	1883.
Ent. for cons	$21,166,592	$24,877,792	$19,253,292
Do. for warehousing	8,449,640	8,552,410	10,946,440
Free goods	11,652,398	11,471,813	9,164,551
Specie and bullion	7,312,131	481,369	3,732,716
Total ent. at port	$48,580,761	$45,383,384	$43,096,999
Withdrawn from warehouse	7,813,347	7,085,090	9,188,662

The foreign imports at New York for three months from January 1, were:—

	1881.	1882.	1883.
Ent. for cons	$54,341,210	$69,936,736	$58,454,834
Do. warehouse	20,579,320	22,352,069	28,104,818
Free goods	31,275,623	32,562,983	30,886,616
Sp. and bullion	12,626,630	1,081,415	4,846,899
Total en. at port	$118,823,383	$125,933,203	$122,293,167
Withdrawn from warehouse	22,205,211	22,336,742	....

The foreign imports at New York for nine months ending March 31, were:—

	1881.	1882.	1883.
6 months ending January 1	$280,770,515	$252,275,460	$248,987,459
January	36,085,359	40,135,673	40,250,143
February	34,157,263	40,414,146	38,946,025
March	48,580,761	45,383,584	43,096,999
Total nine months	$399,593,898	$378,208,663	$371,280,626
Deduct specie	83,221,166	27,369,713	10,590,922
Total mdse	$316,372,732	$350,838,950	$360,689,704

The duties received at New York for the nine months ending with March were:—

	1880-'81.	1881-'82.	1882-'83.
In July	$13,360,394 37	$12,079,573 95	$13,730,752 87
In August	14,492,361 87	15,205,469 58	16,483,260 62
In September	12,856,636 10	14,104,647 51	14,690,362 74
In October	10,574,333 53	13,011,426 27	13,095,876 47
In November	9,079,082 36	9,711,039 46	9,938,679 71
In December	9,230,734 57	10,972,321 38	10,380,192 56
In January	10,572,559 15	13,387,515 96	12,574,837 84
In February	11,217,766 87	13,585,053 25	12,191,602 66
In March	13,122,964 03	13,999,138 76	12,438,301 64
Total 9 mos	$104,506,832 85	$116,055,186 12	$115,523,867 11

The exports from New York to foreign ports in the month of March, were:—

	1881.	1882.	1883.
Dom. produce	$34,492,683	$24,689,145	$30,427,317
For. free goods	1,250,188	278,801	1,183,596
Do. dutiable	547,814	620,947	480,783
Specie and bullion	1,304,122	4,339,698	2,363,445
Total exports	$37,594,807	$29,928,591	$34,475,141
Do. exclusive of specie	36,290,685	25,588,893	32,091,696

The exports from New York to foreign ports, for three months from January 1, were:—

	1881.	1882.	1883.
Dom. produce	$90,083,691	$76,056,644	$85,508,189
For. free goods	3,240,988	1,506,432	2,528,672
Do. dutiable	1,366,928	1,609,608	1,374,154
Sp. and bullion	3,523,079	13,858,000	4,837,004
Total exports	$98,214,986	$93,030,684	$84,248,019
Do. exclusive of specie	$94,691,907	$79,172,684	$89,411,015

The exports (exclusive of specie) from New York to foreign ports for nine months ending with March 31, were:—

	1881.	1882.	1883.
Six months ending January 1	$220,839,350	$187,136,859	$188,770,362
January	30,264,919	27,848,734	28,890,949
February	28,136,303	25,735,057	28,428,370
March	36,290,685	25,588,893	32,091,696
Total produce	$315,531,257	$266,309,543	$278,181,377
Add specie	8,172,480	20,129,049	16,938,677
Total exports	$323,703,737	$286,438,592	$285,120,054

THE bill amending the Broadway Underground Railway Charter so as to allow a four-track road, Arcade system, has passed the New York Assembly.

THE steel blades of Damascus, the oldest city in the world, are widely celebrated. So are also the steel pens of the Esterbrook Steel Pen Company.

TRAINS on the Nantasket Beach Railroad commenced running on the 18th inst. The single fare on the road has been advanced to fifteen cents.

THE Railroad Commissioners do not recommend a reduction of fare on the elevated railroads.

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MR. JAMES J. WHITE, Ottawa, Canada, writer of "Our Canadian Letter," acts as agent for the AMERICAN RAILROAD JOURNAL in Canada. He is authorized to receive, in behalf of the company, subscriptions and advertisements for this journal· also news of the character which he can utilize in the preparation of his Letter, or send to us for use elsewhere within these columns. He respectfully invites information concerning Railroad matters generally, Mining, Banking, Finance and Manufactures.

☞ ALL correspondence, communications and contributions intended for publication should be addressed to the "Editor of the AMERICAN RAILROAD JOURNAL." Business letters, subscriptions, orders for copies and advertisements should be sent to the "PHENIX PUBLISHING CO. OF N. Y.

WE invite railroad officers to send us notice of elections, transfers, appointments, resignations, etc.; and all our readers would oblige us by furnishing us with any items of news which may come to their knowledge and are of a suitable nature for our columns. It is our intention to publish monthly full and accurate information regarding those enterprises and industries to which the AMERICAN RAILROAD JOURNAL is devoted, and to effect this end we solicit the co-operation of readers interested therein. We aim specially to record all new railway enterprises in the United States and Canada, and to note the progress of construction on all new roads and extensions; and we request those concerned in railway building to give us early information concerning the above, that our reports may be as complete as possible.

Correspondence and contributed articles are also requested for our special departments devoted to Finance, Commerce, Street Railways, and New Inventions. All communications should bear the name and address of the writer, not necessarily for publication, but to insure the editor's attention.

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THE present is the first number of the AMERICAN RAILROAD JOURNAL as a monthly magazine, and No. 1 of a new volume. Upon examination it will be found that it possesses features which, we believe, give it superiority above any past issue. Thirty-six pages—the minimum number, by the way—somewhat reduced in size from that of previous volumes, and looking handsomer on that account, because having wider margins; a new measure of columns, and two instead of three to each page; a new and fine quality of pleasantly tinted paper, and a wrapper which the most æsthetic people will regard with favor—these are among the new and improved characteristics of a veteran business journal, the future of which was never more hopeful than now. The changes indicated, especially that as to periods of issue, have been made after much careful consideration; and are adopted with the means and the spirit which will do more than maintain the excellent standing which the AMERICAN RAILROAD JOURNAL has enjoyed for more than fifty years.

A CONTEMPORARY, *The Railway Age*, Chicago, gives earnest support to the alleged intention of the promoters of the coming Railroad Exposition to devote its proceeds to the erection and endowment of a great hospital and home for railway employés. Its argument is best summarized in a sentence which we quote, with the expression of our hope that the humane feeling prompting the project and the admirable remarks of our fellow journal, will not be disappointed: "The great majority of railway men in the country are still unprovided for, and sudden accident or sickness and certain disablement from old age will leave many of them homeless."

MR. ALBERT MICHELSON, Chicago, Superintendent of the American Railway Construction Company, and patentee of the "Monarch" track-layer, writes us as follows:

"There being only two inventors of patent track-layers besides myself, but many dealers in the article, I ask you whether it should not be the duty of each of the claimants for patent track-layers to have their respective *unrivalled* machines exhibited at the coming exhibition of railroad appliances at Chicago in May and June next, in order to enable the railroad men to examine into the merits and reject what is called antidiluvian in that line? Please invite through the columns of your valuable paper the respective inventors of and dealers in patent track-layers to comply with the above request for their own and the railroad community's benefit."

Our correspondent's request is so reasonable that we heartily accede to it by the publication of his letter.

ADVERTISEMENTS of many, perhaps of most kinds, should be briefly worded, and made to attract attention by the use of a picture or pictures. Apart from the pleasure given by a well-executed engraving of a subject with some pretensions to beauty, as the examination of our columns demonstrates, the necessity of a tedious description of an ingenious piece of mechanism is often avoidable by the presentation of a pictorial illustration. As regards new designs in furniture and such things, their desirability cannot be made to appear so favorably in any other way than by that of their faithful representation in picture. The experience of advertisers generally bears out the truth of these statements, and no one can fail to have noticed accordingly, the wonderful multiplication of pictorial business announcements during recent years. The admirable work of the engraver appears increasingly with that of the ingenious and sagacious writer of advertisements, at once an embellishment

and a source of income to the public prints; while, in his turn, the printer's honored art is exercised in order to the best display of the words given him to print in type, and to produce the best possible impression from accompanying cuts. Perhaps no branch of industry than that including the multifarious interests of "railroading" illustrates the appropriateness of these remarks so strongly. While the dry goods merchant seems to be under no pressing obligation to accompany his announcement of a "tremendous sacrifice" in the sale of hosiery, with the picture of a pair of unbleached cotton stockings, the manufacturer of a new mechanical invention available in the improvement of railroad service, cannot too promptly acquaint the companies and the public with the same, by means of illustration as well as in words. Obviously this remark needs no expansion; and we will add only, that now and in the future, as throughout a long past, the publishers of the AMERICAN RAILROAD JOURNAL gladly give and will give place in its advertising columns, to pictures as well as lettter-press, and avail themselves of every means, pictorial and otherwise, to increase the public acquaintance with the results of ingenuity as applied to the improvement of means of communication.

MEAT SUPPLY AND CARRIAGE.

IN no department of trade is there more excitement at this time than in that of supplying flesh meats. The Americans, and the Europeans of the same stocks whence they have sprung, are a flesh-eating people. The nations of Western Europe which have shown the greatest aptitude for colonizing, trade and war are those who eat the most meat. It is not at all clear that their success in war, or in peace, is due to this diet as a cause; for it may happen that the indulgence in flesh is only one of many luxurious habits due to greater wealth, and this in its turn may be traceable to greater inherited energy, superior brain-power, inventive genius, or other race characteristics. However this may be, the prevailing passion is among individuals and nations to consume all the flesh foods that one can afford. The cost of beef has much to do with its consumption, and if the price rises above a certain range either in the United States or in England, the consumption droops, and other articles are in demand as substitutes. Beef and pork are the great staples of these animal foods—mutton, game and fish being local and limited in their use. Sheep, in fact, although there are millions in the country, are looked upon as a source of profit from their wool and skins rather than for their meat. Poultry and eggs, however, in France and England as well as in America, are the real competitors with the pastures, and take the first place among the middle class population of continental countries.

Heretofore it has been necessary to draw upon the pastures of our western States to supply the wants of the seaboard and manufacturing population. Fifty years ago cattle were driven on the hoof from Kentucky, Ohio and Indiana to the Atlantic markets. Presently the railroads began to be used for bringing them to the same points. Further and further west the rail-haul was pushed, and when the Mississippi River was reached it was supposed that the very utmost in that direction had been accomplished. It was not dreamed that the vast plains west of the Missouri River as far as the Rocky Mountains could ever be competitors with the fat pastures of central Kentucky, Ohio, or the Genesee Valley of New York. That is now the fact. Far beyond the great plains of Kansas, in the valleys of Colorado and Wyoming, on the prairies of Iowa and Dakota—the former grazing grounds of immense herds of wild bison—vast tracts of land are now devoted to grazing droves of more or less improved horned cattle with which to supply New York, Boston, or even European markets. The railroad alone has made this possible. Without that wonderful development of mechanical skill and organizing industrial capacity it could not have come to pass; and fresh beef would have been a luxury beyond the reach of common laborers. No more striking illustration of the far-reaching beneficence of railroads need be desired.

As might be expected, so great a revolution could not occur without some incidental injury to some one. The values of the far-famed "blue-grass" pastures of Kentucky and Ohio were temporarily depressed; they felt for a time the stress of competition with the cheaper lands of Iowa, Kansas and Texas, whose herds were taken to the same markets at but little greater cost of transportation. Vast fortunes were amassed by the rearing of cattle on cheap lands where neither rent, interest, fences nor shelter was required; and in fact where the sole expense was for mounted herders. So far has the capacity of rail transport been pushed in the matter of live-stock that it reached and spread over the unsold and unappropriated lands of the public domain west of the hundredth meridian. The result was that cattle by thousands have been grazed on public lands without paying anything for the privilege. The same was true of the public lands in Texas. Even the railroad lands, not being within fences, were frequently occupied by herds, with no other recompense than the freight money on the cattle. This was as if the public penitentiaries were to be employed in producing articles of dress in competition with private dealers, and giving away the product. Farmers who had expended a hundred dollars in labor or money in improving lands in Lancaster county, Penn., or in any of the adjoining States, had reason to complain that the public bounty was being perverted to diminish the value of their products. Under the absurd homestead law, which in practice inures chiefly to the benefit of land speculators, a man would be paid or hired to occupy a little tract adjoining a spring or stream of water, as his own farm, and thereby secure the free run of a hundred thousand acres around it for his herds to roam in. This filching process has kept on until now the number of such squatters on the public lands is so large as to interfere with the privileges of each other. Congress will be asked to make some more suitable provision than the existing law, which was originally framed for field-farming. The government ought long ago to have provided a system of stock ranges by leases of large tracts adjacent to water for all that wide expanse of country unsuited to ordinary agriculture between the hundredth meridian and the Sierra Nevada range.

During the past few weeks the newspapers have contained the record of numerous large transfers of beef-cattle—probably larger than was ever turned over, in trade, in the world before. The price of yearling heifers, which ranged from about two dollars at the time of the American settlement of California and Texas, has risen to twelve and fifteen dollars in these same regions.

The price of fatted cattle further east has necessarily felt the advance. At the same time are recorded the sales and leases of large tracts for grazing purposes. It now becomes politic to look up the owners of grazing tracts and secure their permission to graze. This is a healthy symptom. In other cases the purchasers have found it worth while to surround large parcels by "barb wire" fencing, all of which indicates that the business of the grazers is growing into a steady industry, and less and less like freebooting.

When beef-cattle can be laid down at the export cities for about six dollars per hundred pounds, live weight, or about twelve dollars dressed weight, they can be sent to London at a profit. That market is virtually insatiable with our beef—provided it can be landed in good order. Several collossal experiments are now being made in the carriage of dressed meat in "refrigerator" cars, apparently with the hope of success. One such establishment for slaughter at Victoria, in southern Texas, has an immense outfit. Two or more are in operation in Chicago, and at this time the shippers of live cattle are complaining to the Pool Manager that unless he can put up the rates on the dressed article their business will be ruined. A further revolution in meat transportation is impending. If the animals are slaughtered at the Western fields, thither must move the tanneries and the shoe and harness factories; and so the mighty railroad agency goes on upbuilding and destroying.

Speculating on Margins.

A DECISION was rendered in the Supreme Court of the United States at Washington, on the 16th inst., in the brokerage case of John H. Roundtree, plaintiff in error, against Ernest F. Smith and M. C. Lightner—error to the Circuit Court of the United States for the Western District of Wisconsin. This was a suit growing out of speculations in domestic produce in the City of Chicago, on "margins." It was brought by the firm of Smith & Lightner, brokers, against their customer, John H. Roundtree, to recover a balance alleged to be due them on account of purchases and sales of pork, lard, wheat, &c., made by his order. Roundtree set up the defence that the brokers had not actually bought or sold for him the commodities specified, but had merely speculated in "options" on his account; that these "options" were nothing but gambling contracts or bets on the future prices of the various articles of produce to which they related; that they were not designed to be actually performed by delivery, but the differences were to be adjusted and payments made and accepted according to the differences between the contract price and the market price at the date fixed for delivery; and that finally these gambling contracts were illegal and void. The plaintiff offered no proof that the particular contracts in controversy were really bets on future prices, but he did offer to show that a very large proportion of all the contracts made by members of the Chicago Board of Trade for the sale of produce were settled by the payment of differences; that nothing else was expected, and that the proportion of such betting contracts in which delivery of the merchandise was neither expected nor desired was so great in comparison with *bona fide* contracts as to justify the inference that the contracts made for him by his brokers were of the gambling kind. The Court held that evidence of what other people intended by other contracts of a similar character was not sufficient of itself to prove that the parties to these contracts intended to violate the law, or to justify a jury in making such a presumption. "It is also to be observed," the Court says, "that the plaintiffs in this case are not suing on the contracts, but for services performed and money advanced for the defendent at his request, and though it is possible that they might under some circumstances be so connected with the immorality of the contract as to be affected by it, they are certainly not in the same position as a party suing for the enforcement of the original agreement. The judgment of the Circuit Court n favor of the brokers is affirmed with interest."

Master Car-Builders' Association.

VARIOUS committees of the Master Car-Builders' Association have issued a series of circulars in the form of inquiries addressed to members. These inquiries are very close, and of great practical importance. We hope that the responses made to them will prove satisfactory to the committees, who will report at the annual convention to be held in Chicago, beginning June 12 next. The subjects upon which information is sought are, "The most Economical Capacity for Freight Cars"; "The Causes of Accidents to Train and Yard Men"; "Sharp Wheel Flanges"; and "Refrigerator Cars."

THE Chief of the Bureau of Statistics reports that during the month of March there arrived in the customs districts of Baltimore, Boston, Detroit, Huron, Minnesota, New Orleans, New York, Passamaquoddy, Philadelphia and San Francisco 44,483 passengers, of whom 38,730 were immigrants, 2956 citizens of United States returned from abroad, and 2797 aliens not intending to remain in the United States. Of this total number of immigrants there arrived from England and Wales, 3286; Ireland, 2518; Scotland, 905; Austria, 818; Belgium, 394; Bohemia, 305; Denmark, 846: France, 383; Germany, 14,759; Hungary, 1328; Italy, 3365; Netherlands, 384; Norway, 667; Russia, 338; Poland, 85; Sweden, 988; Switzerland, 1602; Dominion of Canada, 5667; and from all other countries, 192.

Imports of Foreign Dry Goods.

THE Imports of Foreign Dry Goods at New York for the month of March, were :—

ENTERED FOR CONSUMPTION.

	1881.	1882.	1883.
Manufs. of wool	$1,708,581	$1,934,245	$1,714,547
Manufs. of cotton	2,235,289	2,400,579	2,470,403
Manufs. of silk	2,526,807	3,277,286	2,349,251
Manufs. of flax	1,236,087	1,257,591	1,363,349
Miscell. dry goods	980,890	966,578	901,604
Total ent. for consumption	$8,693,654	$9,866,279	$8,799,214

WITHDRAWN FROM WAREHOUSE.

	1881.	1882.	1883.
Manufs. of wool	$859,651	$675,661	$939,687
Manufs. of cotton	388,152	297,364	511,901
Manufs. of silk	468,740	485,681	866,611
Manufs. of flax	531,983	370,223	418,777
Miscell. dry goods	243,702	202,820	279,202
Total withdr'n from warehouse	$2,492,228	$2,097,749	$3,016,178
Add ent. for con	8,693,654	9,890,279	8,799,214
Total thrown on the market	$11,185,882	$11,964,028	$11,815,392

ENTERED FOR WAREHOUSING.

	1881.	1882.	1883.
Manufs. of wool	$722,143	$629,605	$1,135,311
Manufs. of cotton	382,787	240,211	549,162
Manufs. of silk	514,857	382,507	1,164,118
Manufs. of flax	344,401	277,439	324,783
Mis. dry goods	321,133	195,037	455,786
Total ent. for warehouse	$2,285,381	$1,731,399	$3 529,160
Add entered for consumption	8,693,054	9,866,279	8,799,214
Total ent. at port	$10,979,635	$11,597,678	$12,328,374

The Imports of Dry Goods at New York during the first quarter of the year, were :—

	1880.	1881.	1882.	1883.
January	$10,714,881	$10,128,486	$12,326,440	$13,345,312
February	15,691,575	13,085,298	16,004,077	13,730,717
March	12,238,350	10,979,085	11,597,678	12,328,374
Total three months	38,644,806	34,192,819	40,528,195	39,404,403

A DAILY chicken train has been started on the Pennsylvania Railroad. They have a passenger Cochin the rear and a locomotive to pullet.

CORRESPONDENCE.

[COMMUNICATIONS are solicited for this department on all subjects pertaining to Railroads, Steam Navigation, Machinery, Manufactures, etc. No attention will be paid to communications unless the name and address of the writer is furnished us, though if desired, they will be withheld from publication. We assume no responsibility for statements made by correspondents, and we do not necessarily endorse ideas advanced by them. Under these conditions we think it of value to our readers to devote a liberal space to the free discussion by others—whose opinions may be at variance with our own—of subjects pertinent to this department of the AMERICAN RAILROAD JOURNAL.]

OUR CANADIAN LETTER.

[From our Special Correspondent.]

WEST INDIAN PHOSPHATE.

The works at Mona Island, West Indies, which were started about two years ago, are now well advanced, and with a full productive capacity of from 20,000 to 30,000 tons a year.

The guano is already in high favor in the United States, where it has been thoroughly tested, and is pronounced one of the best, if not the very best, of such material imported there.

The phosphate-rock, of which now considerable is raised, is in active request in England and on the Continent, especially the latter, where the more highly concentrated fertilizers are generally used.

The deposits or accumulations occur on the floors of the immense caves penetrating the coast line of the island—a tertiary coral rock—for ten or twelve miles almost uninterruptedly.

The thickness of the deposits is usually about four or five feet. The rock-phosphate, which is really phosphatized coral-rock, is found both as a massive stratum or shell underlying the bed guano, and also incrusting the masses of rock found imbedded in the guano. The deposits are very interesting from a scientific point of view. The crystalized calcite, anagonite, and gypsite are all found as pure as it from a primary formation. Many new combinations of phosphoric acid, giving rise to new series of phosphatic minerals, are quite abundant. The two examined and described by Professor Sheppard, of New Haven, as Monite and Monitite are bi-bassic and hold the highest combination of phosphoric acid known in any natural phosphate. They occur well crystalized. The Mona guano analyzes 52 to 68 per cent bone phosphate on a dry basis, and commercial samples of the rock 87 to 88 per cent bone phosphate. Both are singularly free from iron and alumina.

Many Indian relics and remains have been found in and under the deposits, viz: implements, pottery, shells, bones, etc. Some of these most interesting relics are in my possession. The work is under the personal supervision of Mr. J. G. Miller, of Ottawa, a practical scientist, who has done more than any other man in making known the value of the immense phosphate deposits of Canada.

TARIFF.

The following is the text of the Canadian Government amended tariff resolutions:—

6 to 12. Carriages: Buggies of all kinds, farm wagons, railway freight carts, pleasure carts or gigs and similar vehicles, 35 per cent ad valorem.

13. Railway cars and all other carriages not enumerated, and sleighs, cutters, wheel-barrows and hand-carts, thirty per cent ad valorem.

14 to 19. Children's carriages of all kinds, 35 per cent ad valorem; parts of carriages or other manufactured articles shall be charged with the same rate of duty, or a proportionate valuation, as that chargeable upon the finished article.

21. Strike out the words "20 per cent ad valorem," and insert the words, "the duty paid thereon, less 5 per cent of the amount so paid."

23. After the word "cottons" insert the words, "except jeans, coutiles, cambrics, silicias and casbans." Leather—To read as follows: Under the heading "Leather" in the item "sole and belting leather and all upper leather," after the word "sheep" and before the words "calf, tanned or dressed," strike out the words "buck and antelope," and substitute therefor the following item:

33. Glove leathers, viz.: Buck, deer, elk and antelope, tanned or dressed, colored or not colored, ten per cent ad valorem.

34. Drop.

49. Wools and wollens, to read as follows:—Under the heading "Wools and Woolens" in the first item, after the words "Worsted Yarns," strike out the words and figures, "under number 30," and after the word "hosiery" and before the word "seven" strike out the words, "of every description," and insert the words, "not elsewhere specified."

50. In the second item concerning "Clothing ready made," after the word "including" and before the word "Cloth Caps" insert the words "Knitted goods, viz: "Socks and Stockings."

51. Dress or Costume Cloths, serges and similar fabrics, under twenty-five inches wide and weighing not over three and a half ounces per lineal yard, either or both, 10 per cent ad valorem. Winceys to remain as they are in the present tariff.

52. Drop.

56 to 72. Agricultural implements read as follows: Mowing-machines, self-binding harvesters, harvesters without binders, binding attachments, reapers, sulky and walking plows and parts of the same. Harrows, scythes, horse and hand hay rakes, garden rakes of any material, grain seed drills, spades and shovels, hoes, hay, straw, manure, spading and mining forks, and all similar articles and parts thereof, 35 per cent ad valorem.

73 to 78. Portable machines, portable steam engines, threshers and separators, horse powers, portable saw mills and fanning mills and parts thereof, 35 per cent ad valorem.

82. Buckram. Strike out.

89. Jellies and Jams. To be five cents a pound, not six cents.

95. Oil Cloth—Strike out.

98. Vaseline, in bulk. To be four cents per pound, not five cents.

101. Files and rasps. 35 per cent ad valorem, instead of 30 per cent ad valorem.

After the item concerning "proprietary medicines," and before the item concerning "prunella" insert the following: "All medicinal preparations, whether chemical or otherwise, usually imported with the name of the manufacturer, shall have the true name of such manufacturer and the place where they are prepared permanently and legibly affixed to each parcel by stamp, label or otherwise; and all medicinal preparations imported without such names so affixed shall be forfeited."

BANK STATEMENT.

The following is the statement of circulation and specie for the month of March:—

Fractional notes	$176,183 10
Provincial notes	54,228 13
Dominion fours	298,064 00
Montreal issue	7,423,484 50
Toronto issue	5,248,366 50
Halifax issue	1,820,634 00
St John issue	740,846 25
Victoria issue	39,963 50
Total	$15,801,769 98
For February	$15,634,463.73
Excess of specie and guaranteed debtentures	1,350,846.02
Excess of unguaranteed debtentures	898,672.51
Total excess	$2,249,518 53

RAILROAD AND OTHER NOTES.

Mr. Wainright, assistant general manager, is in city. He has not yet heard anything definite or official regarding arrangements said to be going on between his road and the syndicate.

THE Midland Railway held their annual meeting in Peterboro yesterday. The report of the president showed that the affairs

of the company were in a most flourishing condition. Mr. G. A. Cox was re-elected president and general manager, and Mr. Gooderham vice-president. The following were elected directors: Messrs. G. A. Cox, Wm. Gooderham, J. R. Dundas, M. P., H. P. Dwyght, S. D. Egar, J. M. Ferris, M. P., F. W. Henshaw, Robert Jaffray, Thomas Kelso and E. S. Vinden.

Great credit is due to general superintendent D. Pottinger of Inter-Colonial Railway for having issued an order that hereafter any officer or employé of the Inter-Colonial Railway who is known to be intoxicated, whether on duty or not, will be at once dismissed from the service. Mr. Pottinger deserves, and will receive, the sincere gratitude of the public.

Much satifaction is expressed at the failure of the combination arrangements that have been represented as being nearly completed between the Grand Trunk and the Canadian Pacific Railway.

Sir Charles Tupper and Mr. Collingwood Schrieber last week examined the progress on the St. Charles embranchment of the Inter-Colonial, and made arrangements concerning the same between the Grand Trunk and Inter-Colonial.

Sir Leonard Tilly moved that the House go into committee to-morrow to consider the following resolution: That it is expedient to provide by law that a bounty of one dollar and fifty cents per ton be paid on all pig iron manufactured in Canada from Canadian ore, between the 1st of July, 1883, and 30th of June 1886 inclusive; and that a bounty of one dollar per ton be paid in like manner, on the same manufactured between July 1, 1886, and June 30, 1889 inclusive.

The Welland Railway Company will put in two new sidings at St. Catherines, enlarge their freight house, and make ample accommodations to meet expected business, caused by their arrangement with the Grand Trunk.

AMERICAN ENTERPRISE.

The American Brake Company of St. Louis, Mo., have established an agent in Canada. There is no doubt that when the merits of their brake are made known, they will be applied to all the Canadian railways.

The United States Wind and Engine Company of Batavia, Illinois, have also opened an agency in Canada, and will, no doubt, secure a share of Canadian trade.

It is thought that work will begin shortly on the Ottawa and Gatineau Railway; an engineering party are locating some ten miles for contract.

Canada is rejoicing over the return of H. R. H. the Princess Louise. His Excellency, the Govenor General and the Princess are beloved by the Canadian people, and justly so.

We are indebted to Mr. Francis J. Lynch, assistant chief of railways and canals, and Mr. Fred Jones, private secretary to the engineer-in-chief, for many favors. These gentlemen are courteous and kind to all who have business to transact with the department, and in consequence are most popular.

Sir Charles Tupper, Minister of railways and canals, leaves for England next month to act in the capacity of High Commissioner for Canada. Sir Charles is one of the ablest of Canada's able statesmen, and will be missed by his party, and by the people generally.

The Ottawa, Waddington and New York Railway, will, it is confidently expected, be commenced shortly.

"W."

OTTAWA, CANADA, April 17, 1883.

Patent Laws and Poor Inventors.

I. J. EDGE, IN "WOOD AND IRON."

SUPPOSING some very poor man should invent something useful, what should he do? Get it patented of course. Whether this would be prudent or not depends on circumstances, as neither the inventor himself, nor one in a thousand of his acquaintances might be able to tell whether the invention would be worth its own expenses or not, for but a very small percentage of inventors can form a correct idea of the value of an invention until after it has been tried by the test of the markets. Some may say, "But the cost is so very trifling that if the idea is worth anything it must more than cover the expense." The cost is trifling to some persons, but to others not quite so trifling; for there are hundreds of men who have first-class mechanical abilities, and who are clever, intellectual men in every way, but to whom the expense of securing a patent is a matter of great importance; and from this class most of the useful inventions have come. If the inventor writes to a patent agency the only information he gets is relative to procuring a patent; nothing with regard to its probable value will he receive. He must risk that, fees of course being the chief object of the patent agencies. And if the inventor spends his money in securing a patent on something that will be worthless when patented, that is his business, not theirs. What patent agency has ever replied to a client thus, "We can procure letters patent for you on the invention you describe, but we believe it to be an unprofitable investment, as we think you will not be able to realize from it the amount you must necessarily expend in procuring the patent." Such an answer might be honest enough, but it would be bad policy on the part of the patent agency, for most of their fees are obtained from inventions which are worthless when patented. It costs $40 to apply for a patent, which is lost if the patent is not granted, and $20 more when it is granted, making $60 in all, and then the patentee may not be able to sell it for anything. In case the inventor should have more than one idea, say several, conceived from time to time in his mind, he might not be able to select the best one to get patented. Should he disclose his ideas to the public some dishonorable person might steal them: he is in a dilemma; to whom shall he look for the information he requires? None will aid him. He must wait till fortune or time brings circumstances so that he can secure a patent, which he may never be able to accomplish. It is well known that inventors have lived in poverty for years, still hoping some time to be able to get their ideas advanced and reap the just rewards of their ingenuity. We may safely infer that many have died during this period of waiting, and their valuable secrets have been lost to the world forever. The great difference between civilized and enlightened man and semi-barbarous man is, that the former cultivates his ingenuity, while the latter either has none or does not cultivate what little he has. It is mainly due to the help that this country has given to her inventors that she now takes the lead of most other countries if not all, in mechanics. She has done much for the inventor, and has profited well by it. But more needs to be done yet—not to fill the pockets of successful inventors any fuller, but to help the poor inventor to get his invention into the market, to give the world the benefit of his ideas, and give him the reward he deserves. Now an author, artist or sculptor can have his work copy-righted for five or six dollars, while a mechanic who is obliged to work hard by the day, must expend at least sixty dollars, that is, ten times as much, before he can realize one cent for his invention. To a well-to-do man this sum is insignificant, but there are many who, with excellent intellects and natural ingenuity, combine a thorough knowledge of mechanics both practical and theoretical, but who cannot afford to run the risk of losing so much. As the patent laws are at present, the poor mechanic who makes an improvement in a tool, or invents a better one, for which he may not receive more than two or three hundred dollars, must pay fully as much to secure his rights as the more fortunate inventor whose patent right is worth millions. For the inventor who has a good idea, and the means to carry it through, the present patent laws cannot be much better, but those who are without means and who are unable to reach the protection of the laws, are not benefited much by them. Well, what can be done? The remedy is simple and the prescription is easily written. Let the government appoint a committee of competent and reliable examiners, to whom the poor man can disclose his ideas with safety, and have them recorded, then if the examiners deem his plans worthy of letters patent, let such be granted, the invention paying all expenses by affixing revenue stamps thereon until all such expenses have been paid. Such a system could injure no one and would greatly benefit the public at large, but more especially this country and her ingenious poor inventors.

RAILROAD EARNINGS.—MONTHLY.

B., C. Rap. & N.:	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1881	167,750	124,510	148,551	184,680	165,630	205,912	174,351	209,112	221,801	221,748	202,180	232,812	2,259,037
1882	252,823	225,631	224,107	178,304	199,278	211,257	198,476	224,921	261,439	300,155	278,439	246,662	2,800,679
1883	197,402	187,001	252,913	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Central Pacific:													
1881	1,602,907	1,454,218	1,709,658	1,872,370	2,091,411	2,159,382	1,899,346	2,088,519	2,185,303	2,507,857	2,297,971	2,225,179	24,094,101
1882	1,830,469	1,720,675	1,969,737	2,054,687	2,342,298	2,229,105	2,076,648	2,350,557	2,495,445	2,424,529	2,139,299	2,020,349	25,662,757
1883	1,718,000	1,424,000	2,021,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chesapeake and Ohio:													
1881	162,540	184,389	228,479	227,343	252,235	241,135	225,096	262,858	247,144	236,396	230,022	203,562	2,702,762
1882	208,746	179,053	215,445	267,454	255,939	260,753	306,831	371,175	332,219	347,882	287,850	.....	.....
1883	244,142	250,287	270,676	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago and Alton:													
1881	487,890	461,641	529,915	558,190	548,556	635,860	676,205	769,751	774,790	771,844	672,380	646,812	7,557,741
1882	585,830	517,897	588,700	564,861	559,577	617,250	702,635	856,398	912,692	858,674	749,915	701,066	8,215,495
1883	637,804	538,537	671,576	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago and Northwestern:													
1881	1,240,664	963,204	1,178,795	1,474,612	1,879,006	2,306,440	1,983,032	2,315,164	2,292,676	2,341,098	2,019,038	1,855,477	21,849,209
1882	1 644,935	1,474,176	1,672,931	1,668,741	2,110,947	2,022,700	2,025,736	2,099,755	2,497,053	2,592,100	2,069,287	1,718,379	23,828,973
1883	1,382,704	1,204,907	2,059,700	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, Burlington and Quincy:													
1881	1,307,948	1,034,821	1,418,149	1,574,371	1,679,455	2,083,803	1,888,358	2,173,945	2,262,981	2,031,001	1,816,133	1,905,490	21,176,455
1882	1 658,834	1,457,300	1,566,217	1,530,838	1,505,261	1,437,164	1,625,006	2,086,858	2,186,400	2,270,444	2,199,421	2,027,060	22,550,804
1883	1,625,630	1,611,021	2,347,089	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, Milwaukee and St. Paul:													
1881	990,847	682,717	916,989	1,259,946	1,538,491	1,729,811	1,568,706	1,678,361	1,644,670	1,591,052	1,560.597	1,854 269	17,025,462
1882	1,434,536	1,376,376	1,561,386	1,518,000	1,629,000	1,620,000	1,465,000	1,545,000	1,950,000	2,251,000	2,072,000	1,964,000	20,386,726
1883	1,359,000	1,258,000	2,044,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, St. Paul, Minneapolis and Omaha:													
1881	257.786	158,594	251,648	261,211	350,124	404,562	383,202	385,586	373,370	379,029	592,921	432,615	3,981,296
1882	327,498	333,200	413,200	356,558	406,420	363,109	331,480	394,555	482,997	546,071	317,595	375,796	4,973,052
1883	302,700	277,900	415,800	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Denver and Rio Grande:													
1881	307,476	317,681	398,493	433,111	514,767	584,230	548,284	606,193	589,287	638,432	547,055	626,728	5,980,488
1882	488,599	407,000	521,500	559,917	614,298	537,462	495,797	574,040	595.306	630,598	512,965	443,000	6,349,857
1883	418,300	433,400	521,600	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hannibal and St. Joseph:													
1881	154,401	122,874	176,356	190,812	172,950	190,740	201,899	210,240	215,103	231,913	195,607	194,336	2,230,961
1882	125.601	152,691	185,368	150,481	151,999	147,526	184,609	254,569	239,732	238,563	249 252	239,891	2,303,388
1883	179,591	180,887	228,410	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Illinois Central:													
1881	631,281	524,490	557,789	662,493	673,259	803,887	720,004	868,407	828,847	815,238	737 218	763,475	8,586,397
1882	1,019,153	987,998	995.474	640,014	674,749	663,746	752,251	813,600	828,238	865,325	752,144	697,051	8,831,281
1883	1,058,620	931,971	1,106,658	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Indiana, Bloomington and Western:													
1881	90,283	83,261	192,085	203,677	200,064	199,846	190,125	272,114	247,232	225,678	200,450	192,622	2,487,569
1882	195,824	175,755	204,538	205,934	182,554	186,133	206,072	278,814	273,100	269,046	256,938	205,212	2,641,675
1883	248,112	202,931	268,801	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Louisville and Nashville:													
1881	812,118	805,124	947.959	855,704	828,726	1,227,885	817,135	876,192	951,566	1,002,950	1,065,223	1,153,779	11,344,361
1882	964.527	960,315	1,068,834	953,603	958,130	1,215,490	1,063,765	1,043,912	1,114,513	1,215,932	1,192,390	1,221,509	12,981,432
1883	1,118 735	1,015,000	1,135,507	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mobile and Ohio:													
1881	224,347	216,768	230,916	163,551	145,803	136,517	135,546	160,789	210,262	256,924	262,986	258,812	2,403,224
1882	159,676	158,590	148,166	141,957	134,378	135,184	135,174	137,475	157,874	267,433	295,110	307,643	2,179,666
1883	216,608	172,200	180,113	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nashville, Chattanooga and St. Louis:													
1881	178,143	190,866	207,710	183,525	104,430	154,549	150,430	168 317	179,979	172,121	152,059	173,127	2,075,258
1882	170.753	174,974	177,336	154,155	135,556	119,074	160,991	168,304	168,999	180,319	181,336	186,352	1,933,047
1883	197,388	195,262	206,164	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York and New England:													
1881	189,749	173,614	212,019	216,913	217,185	231,518	246,821	280,524	299,573	261,200	240,764	240,063	2,809,255
1882	213,840	217,261	265,222	261,044	289,722	295,392	298,441	346,490	338,347	310,145	276,183	261,082	3,408,169
1883	258,266	231,741	284,869	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York, Lake Erie and Western:													
1880	1,296,381	1,252,218	1,644,958	1,643,151	1,592,544	1,661,812	1,580,976	1,606,874	1,786,417	1,899,910	1,799,338	1,726,788	19,149,361
1881	1,443,437	1,425,765	1,847,261	1,709,057	1,776,891	1,794,982	1,787,081	1,772,895	1,734,200	1,814,866	1,715,469	1,5~1,208	20.393.112
1882	1,318,097	1,304,757	.....	.....	.....	.....	.....	.....	.....	1,819,010	1,818,824	1,691,404	20,203,469
1883	1,524,869	1,283,616	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Northern Central:													
1881	386,157	382,657	452,906	487,273	465,588	487,287	440,811	498,008	429,565	449,664	487,160	476,622	5,443,697
1882	407,368	413,551	430,194	435,129	482,607	482,752	509,683	667,488	592,435	550,225	526,685	490,003	5,800,176
1883	499,252	486,865	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Northern Pacific:													
1881	116,508	78,803	162,084	216,210	312,705	412,024	393,260	434,085	534,363	583,655	475,610	439,724	4,044,576
1882	245.369	268,935	373,141	451,023	616,231	704,617	694,067	727,215	772,838	829.831	761,324	564,749	7,009,344
1883	392,035	373,091	583,400	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Philadelphia and Erie:													
1881	224,303	225,501	285,573	293,323	343,792	350,585	291,669	303.849	276,522	292,392	284,078	282.772	3,454,309
1882	252,727	245.246	265,311	277,851	341,415	347,614	377,206	20,3204	386,455	397,164	369,583	335,513	4,011,413
1883	319,720	295,638	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis and San Francisco:													
1881	212,435	178,234	262,050	265,298	283,399	260,254	252,333	286,373	279,064	308,569	284,320	287,914	3,160,245
1882	256,784	244,654	274,959	242,806	253,419	240,177	318,613	381,637	336,805	360,900	331,490	339,424	3,582,811
1883	278,321	236,278	351,689	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Alton and Terre Haute:													
1881	175,725	166,012	201,137	197,447	172,177	165,896	165,393	189,180	196,368	204,338	169,795	171,127	2,112,801
1882	168,087	140,619	177,609	157,450	162,842	142,742	192,017	236,137	217,659	229,962	206,040	184,526	2,245,320
1883	193,614	177,717	204,762	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Iron Mountain and Southern:													
1881	570,957	560,791	704,002	548,300	479,075	474,302	533,512	644,386	708,325	719,239	687,271	709 498	7,319,744
1882	516,370	501,127	585,008	581,977	519,120	529,700	515,519	675,981	724.160	809,394	843,973	781,305	7,581,635
1883	665,258	522,781	632,228	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul, Minneapolis and Manitoba:													
1881	254,187	159,482	320,962	425,685	382,642	405,322	387,488	414,954	485,736	605,708	508,530	528,262	4,878,960
1882	305,461	418 358	531,071	570,890	858,902	856,417	853,296	801,759	832,776	979,057	913,335	753,515	8,764,770
1883	489,763	389,612	729,844	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Texas and Pacific:													
1881	281,176	260,781	319,928	295,066	281,782	285,405	328,063	381,331	345,790	419,203	369,521	401,058	3,921,569
1882	323,987	278,535	343,442	359,543	409,228	384,713	367,215	439,918	470,613	541,901	619,055	641,044	5,143,179
1883	534,529	416,040	526,901	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union Pacific Railway:													
1881	1,339.799	1,374,740	1,674,860	1,766,894	2,319,238	2,884.774	2.528,826	2,638 659	2,844,357	3,169,530	2,723,608	2,267,004	29,776,899
1882	2,186,020	1 835,620	2,226,832	2,462,004	2,491,590	2,508,453	2,301,000	2,762,107	2,949,112	3,158,337	2,821,070	2,294,000	30,088,109
1883	1,986,535	1,743,207	2,335,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wabash, St. Louis and Pacific:													
1881	865,339	813,374	1,109,399	967,033	1,148,669	1,330,944	1,120,615	1,542,124	1,497.246	1,406,029	1,372,360	1,294,657	14,467,790
1882	1,220,065	1,134,768	1,313,776	1,328,191	1,204,864	1,149,682	1,418,837	1.772,544	1,682,382	1,595,680	1,525,715	1,331,952	16,738,360
1883	1,307,783	1,070,758	1,479,236	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

RAILROAD, TRAMWAY AND CANAL DIVIDEND STATEMENT.

Showing the amount of Stock Outstanding, the Dividend Periods and the date of last Dividend.

Marked thus (*) are leased roads.		Stock out-standing.	Divide'd Periods.	Last Dividend Payable.
Albany and Susquehanna*	100	3 500,000	semi-an	Jan 1, '83 2
Atchison, Topeka and Santa Fe	100	56,932,200	q'arterly	May 15, '83 1½
Atlanta and Charlotte Air Line	100	1,700,000	semi-an	Mar. 5, 83 2
Atlanta and West Point	100	1,232,200	semi-an	Feb. 1, '83 6½
Atlantic and St. Lawrence*	100	5,484,000	semi-an	Mar. 15, '83 3½
Augusta and Savannah	100	1,032,200	semi-an	Dec. 4, '82 3¾
Avon, Geneseo & Mount Morris*	100	225,000	semi-an	Jan. 1, '82 3
Baltimore & Hanover	100	85,805	.....	Apl. 9, '83 3
Baltimore and Ohio	100	14,792,566	semi-an	May 1, '83 5
" " pref.	100	5,000,000	semi-an	Jan. 1, '83 3
Washington Branch	100	1,650,000	q'arterly	May 1, '83 5
Berkshire*	100	600,000	annual..	Apl. 2, '83 1¾
Boston and Albany	100	20,000,000	q'arterly	Mar. 31, '83 2½
Boston & New York Air Line pref.	100	2,795,227	semi-an	Apl. 1, '83 2
Boston, Concord & Montreal pref*	100	800,000	semi-an	Nov. 15, '82 3
Boston and Lowell	500	3,792,000	semi-an	Jan. 1, '83 4½
Boston and Maine	100	7,000,000	semi-an	Nov. 15, '82 4
Boston & Providence	100	4,000,000	semi-an	Nov. 1, '82 3
Attleborough Branch	100	131,700	semi-an	Jan. 1, '83 3½
Boston, Revere Beach & Lynn	100	419,400	semi-an	Jan. 1, '83 3
Buffalo, New York & Erie*	500	950,000	semi-an	Dec. 1, '82 3
Buffalo, New York & Philadelphia pf.	50	6,000,000	q'arterly	Mar. 1, '83 1½
Camden & Atlantic	50	377,400	q'arterly	Nov. 1, '82 4
" " pref.	100	880,650	q'arterly	Nov. 1, '82 3
Camden & Burlington County	100	381,925	semi-an	Jan. 1, '83 3
Canada Southern	100	15,000,000	.....	Feb. 1, '81 2½
Cape May & Millville*	50	447,000	semi-an	Dec. 1, '82 3
Catawissa	50	1,159,500	annual	Oct. 1, '82 2½
" pref	20	2,200,000	semi-an	Nov. 16, '82 3½
" new pref.	50	1,000,000	semi-an	Nov. 16, '82 3½
Cayuga and Susquehanna*	50	589,110	semi-an	Jan. 1, '83 4½
Cedar Rapids & Missouri River*	100	6,850,400	q'arterly	May 1, '83 1
" " " " pref.	100	769,600	semi an	Feb. 1, '83 3½
Central of Georgia	100	7,500,000	semi-an	Dec. 26, '82 4
Central Ohio*	50	2,437,950	semi-an	Jan. 31, '83 3
" pref.	50	411,550	semi-an	Jan. 31, '83 3
Central Pacific	150	59,275,500	semi-an	Feb. 1, 83 3
Cheshire preferred	100	2,100,000	semi-an	Jan. 10, '83 1½
Chicago and Alton	100	12,504,600	semi-an	Mar. 1, '83 4
" " pref	100	2,475,400	semi-an	Mar. 1, '83 4
Chicago, Burlington & Quincy	100	69,814,191	q'arterly	Mar. 15, '83 2
Chicago, Iowa & Nebraska*	100	3,916,200	semi-an	Jan. 1, '83 4
Chicago, Mitwaukee & St. Paul	100	27,904,261	semi-an	Apl. 16, '83 3½
" " " pref.	100	16,447,483	semi-an	Apl. 16, '83 3½
Chicago & Northwestern	100	16,737,655	semi-an	Dec. 27, '82 3½
" " pref.	100	22,210,844	q'arterly	Mar. 27, '83 2
Chicago, Rock Island & Pacific	100	41,960,000	q'arterly	May 1, '83 1¾
Chicago & West Michigan	100	6,706,800	semi-an	Feb. 15, 83 3
Chicago, St. Paul, Minn. & Omaha pf.	100	11,396,600	q'arterly	Apl. 20, '83 1¾
Cincinnati, Hamilton & Dayton	100	3,500,000	semi-an	Jan. 5, '83 3
Cincinnati, Ind., St. Louis & Chicago.	100	8,000,000	q'arterly	Jan. 15, '83 1½
Cincinnati, Sandusky & Cleveland pf.	50	428,850	semi-an	Nov. 1, '82 3
Cleveland Columbus, Cincin. & Ind.	100	14,991,800	.....	Feb. 1, '83 2
Cleveland & Pittsburg*	50	11,235,430	q'arterly	Mar. 1, '83 1¾
Columbus & Xenia*	50	1,786,200	q'arterly	Mar. 10, '83 2
Columbus, Hocking Valley & Toledo	100	10,316,500	.....	Jan. 10, '83 2½
Concord	50	1,500,000	semi-an	May 1, '83 5
Concord and Portsmouth*	100	350,000	semi-an	Jan. 1, '83 3½
Connecticut & Passumpsic Rivers	100	2,244,400	semi-an	Feb. 1, '83 3
Connecticut River	100	2,370,000	semi-an	Jan. 1, '83 4
Cumberland Valley	50	1,292,950	q'arterly	Apl. 2, '83 2½
" 1st pref.	50	241,900	semi-an	Apl. 2, '83 4
" 2d pref.	50	243,000	semi-an	Apl. 2, '83 4
Danbury & Norwalk	50	600,000	semi-an	Apl. 1, '83 2½
Dayton and Michigan*	50	2,402,573	semi-an	Apl. 1, '83 1¾
" " pref.	50	1,211,250	q arterly	Apl. 1, '83 2
Delaware*	25	1,468,940	semi-an	Jan. 2, '83 3
Delaware & Bound Brook*	100	1,652,000	q'arterly	May 14, '83 1¾
Delaware, Lackawanna & Western	50	26,200,000	q'arterly	Apl. 20, '83 2
Denver & Rio Grande	100	33,000,000	q'arterly	Jan. 14, '82 1½
Detroit, Lansing & Northern	100	1,825,600	semi-an	Feb. 15, '83 3
" " " pref.	100	2,503,380	semi-an	Feb. 15, '83 3
Dubuque & Sioux City*	100	5,000,000	semi-an	Apl. 16, '83 3
East Pennsylvania*	50	1,709 550	semi-an	Jan. 18, '83 3
East Mahanoy*	50	392,950	semi-an	Jan. 1, '83 3
Eastern (N. H.)	100	492,500	semi-an	Dec. 15, '82 2¼
Eel River	100	3,000,000	q'arterly	Mar. 5, '83 1
Elmira & Williamsport*	50	500,000	semi-an	Nov. 1, '82 1½
" " pref.	50	500,000	semi-an	Jan. 1, '83 3½
Erie and Pittsburgh*	50	1,998,400	q'arterly	Mar. 10, '83 1¾
European & North American	100	2,500,000	semi-an	Apl. 1, '83 2½
Evansville & Terre Haute	50	3,100,000	.....	Jan. 1, '83 6b
Fitchburg	100	4,950,000	semi-an	Jan. 1, '83 3
Flint & Pere Marquette pref.	100	6,500,000	semi-an	Jan. 15, '83 3½
Fort Wayne & Jackson pref.	100	2,284,800	.....	May 4, '82 2
Georgia	100	4,200,000	q'arterly	Apl. 15, '83 2½
Granite	100	1,250,000	semi-an	Jan. 1, '83 3
Greenwich & Johnsonville	100	118,000	semi-an	Jan. 1, '83 4
Hannibal & St. Joseph pref.	100	5,083,024	semi-an	Feb. 15, '83 3
Harrisburg & Lancaster	50	1,182,500	semi-an	Jan. 10, '83 3½
Harttord & Connecticut Western	100	2,700,000	.....	Dec. 1, '82 1½
Housatonic pref.	100	1,180,000	q'arterly	Apl. 15, '83 2
Illinois Central	100	39,000,000	semi-an	Mar. 1, '83 4
Iowa Falls & Sioux City*	100	4,623,500	q'arterly	Mar. 1, '83 1½
Iowa R.R.& Land Co.	100	7,620,000	q'arterly	May 1, '83 1½
Jeffersonville, Madison & Indi'apolis.	100	2,000,000	q'arterly	May 1, '82 1¾
Joliet and Chicago*	100	1,500,000	q'arterly	Apl. 1, '83, 1¾
Kansas City, Fort Smith & Gulf	100	4,648,000	.....	Feb 15, '83 3
" " " pref.	100	2,750,000	semi-an	Feb. 15, '83, 4
Lake Shore & Michigan Southern	100	49,466,500	q'arterly	May 1, '83, 2
" " (guar.)	100	533,500	semi-an.	Feb. 1, '83, 5
Lawrence*	50	450,000	q'arterly	Apl. 1, '83, 2

Marked thus (*) are leased roads.		Stock out-standing.	Divide'd Periods.	Last Dividend Payable.
Lehigh Valley	50	27,496,895	q arterly	Apl. 16, '83 2
" pref.	50	106,300	q'arterly	Apl. 16, '83 2½
Little Miami	50	4,637,300	q'arterly	Mar. 10, '83 2
Little Schuylkill*	50	2,646,100	semi-an.	Jan. 12, '83 3½
Long Island.	50	10,000,000	q'arterly	May 1, '83 1
Louisville & Nashville	100	25,000,000	semi-an.	Feb. 1, '82 3
Lowell & Andover	100	500,000	semi-an.	Jan. 1, '83 3½
Lykens Valley	20	600,000	q'rterly.	Jan. 3, '83 2½
Maine Central.	100	3,603,300	semi-an.	Feb. 15, '83 2½
Manchester & Lawrence	100	1,000,000	semi-an.	May 1, '83 5
Manhattan	100	13,000,000	.....	.....
" 1st pref.	100	6,500,000	q'rterly.	Apl. 2, '83 1½
" 2d pref.	100	6,500,000	q'rterly.	Jan. 2, '83 1½
Marquette, Houghton & Ontonagon	100	2,756,600	.....	Feb. 15, '83 4
" " pref.	100	2,259 026	semi-an.	Feb. 15, '83 4
Massawippi*	100	400,000	semi-an.	Feb. 1, '83 3
Metropolitan	100	6,500,000	q'rterly	Oct. 2, '82 1½
Michigan Central	100	18,738,204	semi-an.	Feb. 1, '83 2
Middlesex Central	100	280,000	semi-an.	Feb. 1, '83 3
Mill Creek & Minehill*	50	323,000	semi-an.	Jan. 1, '83 5
Mine Hill & Schuykill Hav*	50	4,022,500	semi-an.	Jan. 12, '83 3½
Missouri Pacific	100	30,000,000	q'rterly.	Apl. 2, '83 1¾
Morris and Essex	50	15,000,000	semi-an.	Jan. 2, '83 3½
Mount Carbon & Port Carbon	50	282,350	semi-an.	Jan. 2, '83 6
Nashua and Lowell	100	800,000	semi-an.	Nov. 1, '82 4
Nashua & Rochester	100	1,305,800	semi-an.	Apl. 2, '83 1½
Nashville & Decatur	100	1,356,632	semi-an.	Dec. 10, '82 3
Nashville, Chattanooga & St. Louis	25	6,670,325	semi-an.	Apl. 20, '82 1½
Naugatuck	100	2,000,000	semi-an.	Jan. 15, '83 5
Nesquenoning Valley*	50	1,300,000	semi-an.	Mar. 1, '83 3
New Castle & Beaver Valley*	50	700,000	q'rterly.	Jan. 1, '83 —
New London Northern*	100	1,500,000	q'rterly.	Apl. 1, '83 1½
New York Central & Hudson River	100	89,428,330	q'rterly.	Apl. 15, '83 2
New York and Harlem	100	8,500,000	semi-an.	Jan. 2, '83 4
" " pref.	100	1,500,000	semi-an.	Jan. 2, '83 4
" City Line	—	.....	annual	Apl. 2, '83 2
New York, Lackawanna & Western	100	10,000,000	q'rterly	Apl. 2, '83 1¼
New York, Lake Erie & Western	100	77,087,600	.....	.....
" " " pref.	100	7,987,500	annual..	Jan. 2, '83 6
New York, New Haven & Hartford	100	15,500,000	semi-an.	Jan. 2, '83 5
New York, Ontario & Western pref.	100	2,000,000	.....	Mar. 1, '83 12
New York, Providence & Boston	100	3,000,000	q rterly.	Feb. 10, '83 2
Niagara Bridge & Canandaigua*	100	1,000,000	semi-an.	Apl. 1, '83 3
North Carolina*	100	3,000,000	semi-an.	Mar. 1, '83 3
" " pref.	100	1,000,000	semi-an.	Mar. 1, '83 3
Norfolk & Western pref.	—	15,000,000	q'rterly.	Dec. 15, '82 $1
Northeastern (South Carolina)	50	899,350	.....	Apl. 2, '83 3
North Pennsylvania	50	4,399,750	q'rterly.	May 26, '83 1¾
Northern Central	50	6,500,000	semi-an.	Jan. 15, '83 4
Northern New Hampshire	100	3,068,400	semi-an.	Dec. 1, '82 3
Northern Pacific pref.	100	41,909,132	.....	Jan. 15, '83 11.1
Norwich & Worcester*	100	2,604,400	semi-an.	Jan. 10, '83 5
Oregon & Transcontinental	100	40,000,000	q'rterly.	Apl. 10, '83 1½
Old Colony	100	7,533,800	semi-an.	Jan 1, '83 3½
Oregon Improvement Co.	100	5,000,000	semi-an.	Mar. 1, '83 3½
Oregon Railway & Navigation Co.	100	13,000,000	q'rterly.	May 1, '83 2½
Oswego & Syracuse	100	1,320,400	semi-an.	Feb 1, '83 4½
Panama	100	7,000,000	semi-an	Jan. 10, '83 6½
Paterson & Hudson*	100	630,000	semi-an.	Jan. 3, '83 4½
Paterson & Ramapo	100	248,000	semi-an.	July 1, '82 4
Pemberton & Hightstown*	50	342,150	semi-an.	Jan. 1, '83 3
Pennsylvania	50	85,301,300	semi-an.	Nov. 29, '82 4½
Pennsylvania Co.	50	20,000,000	annual	Dec. 15, '82 4
Peoria & Bureau Valley*	100	1,500,000	semi-an.	Feb. 1, '83 4
Philadelphia, Ger. & Norrist'n*	50	2,231,900	q'rterly.	Mar. 3, '83 3
Philadelphia and Trenton	100	1,259,100	q'rterly.	Apl. 10, '83 2½
Philadelphia, Wilmington and Balt.	50	11,795,050	semi-an.	Jan. 2, '83 4
Pittsburgh, Fort Wayne & Chicago*	100	19,714,285	q'rterly.	Apl. 2, '83 1¾
" Special Imp.	100	7,698,900	q'rterly.	Apl. 3, '83 1¾
Pittsfield & North Adams	100	450,000	semi-an.	Jan. 1, '83 2½
Portland, Saco & Portsmouth	100	1,500,000	semi-an.	Jan. 15, '83 3
Providence & Worcester	100	2,500,000	semi-an.	Jan. 1, '83 3
Rensselaer & Saratoga*	100	6,854,100	semi-an.	Jan. 2, '83 4
Richmond & Danville	100	5,000,000	q'rterly.	Aug. 15, '82 2
Richmond & Petersburg	100	1,009,300	semi-an.	Aug. 1, '82 2
Rochester & Genesee Valley*	100	555,200	semi-an.	Jan. 1, '83 3
Rome, Watertown & Ogdensburg.	100	5,293,900	.....	Jan. 1, '83 3
Rutland preferred	100	4,000,000	semi-an.	Sept. 1, '82 1
Spuyten Duyvil & Port Morris	100	989,000	semi-an.	Jan 2, '83 4
St. Louis, Alton & Terre Haute pref.	100	2,468,406	.....	May 1, '83 7
St. Louis & San Francisco 1st pref.	100	4,500,000	semi-an.	Feb. 1, '83 3½
St. Louis, Jacksonville & Chicago	100	1,293,000	.....	Aug. 1, '82 4½
" " " pref.	100	1,034,000	.....	Aug. 1, '82 4½
St. Paul & Duluth pref.	100	5,121,700	semi-an.	Jan. 1, '83 3½
St. Paul, Minneapolis & Manitoba	100	20,000,000	q'rterly.	May 1, '83 2
Schuylkill Valley*	50	576,050	semi-an.	Jan. 15, '83 2½
Seaboard & Roanoke	100	1,302,200	semi-an.	Nov. 1, '82 5
Shamokin Valley & Pottsville	50	869,450	semi-an.	Feb. 1, '83 3
Shore Line*	100	1,000,000	semi-an.	Jan. 6, '83 4
Sioux City & Pacific pref.	100	169,000	semi-an.	Apl. 2, '83 3½
South Branch (N. J.)*	100	438,300	semi-an.	Jan. 2, '83 3
South Western (Ga.)*	100	5,031,700	semi-an.	Dec. 26, '82 3½
Stockbridge & Pittsfield*	100	448,700	q'rterly.	Jan. 2, '83 1½
Sunbury & Lewistown	50	161,000	semi-an.	Apl. 2, '83 3
Syracuse, Binghamton & New York*	100	2,500,000	semi-an.	Feb. 1, '83 2
Terre Haute & Indianapolis	100	1,988,150	semi-an.	Feb. 1, '83 4
Union Pacific	100	60,854,105	q rterly.	Apl. 1, '83 1¾
United Companies of New Jersey*	100	21,040,400	q'rterly.	Apl. 10, '83 2½
Utica, Shenango & Susq. Valley	100	4,000,000	semi-an.	Nov. 1, '82 3
Utica and Black River.	100	1,772,000	semi-an.	Mar 31, '83 2
Vermont and Massachusetts	100	3,050,000	semi-an.	Apl. 7, '83 3
Vermont Valley	100	1,000,000	annual	Jan. 2, '83 3

FINANCIAL AND COMMERCIAL DEPARTMENT.

NEW YORK, MONDAY, APRIL 23, 1883.

MONEY on call on stocks as collateral during the day was loaned at 5 per cent, but in the last hour of business the rate fell to 4½ and 4 per cent.

The posted rates for foreign exchange were 4.83½ and 4.86. The actual rates were as follows: Sixty days, 4.82¾@4.83; demand, 4.85@4.85¼; cables, 4.85½@¾; commercial bills 4.81@4.81½. Continental bills were as follows, viz: Francs, 5.21¼ and 5.18¾@5.19⅜; reichsmarks, 94½ and 94 15-16; guilders, 40 and 40¼.

It is stated that the New York, Chicago and St. Louis Railway Company is about to make a second mortage for $10,000,000, of which $4,000,000 will be issued immediately, and the remainder reserved to meet future requirements.

The certificate of incorporation of the Home Bank was filed in the office of the County Clerk on the 23d inst. The capital stock is placed at $125,000, with provisions for increase.

It has been decided to increase the bonded indebtedness of the Pittsburgh Belt Street Railroad Company from $10,000 to $30,000, and that of the Twin City, the Pittsburgh and South End, and the Twelfth Street and Arlington Avenue street railway companies from $50,000 to $100,000.

Judgments aggregating $70,000, were entered in the U. S. Circuit Court at Little Rock, Ark., on the 19th inst. against the Memphis and Little Rock Railroad Company, as re-organized, for interest on mortage bonds held by citizens of New York and New Hampshire.

The gross earnings of the Chicago, Milwaukee and St. Paul Railway Company for the year ending December 31, 1882, were $20,386,725.86, the operating expenses $12,186,073.21, and the net earnings $8,200,652.65; for the year ending December 31, 1881, the gross earnings were $17,025,461.66, the operating expenses $10,317,931.14, and the net earnings $6,707,530.52—showing an increase in gross earnings of $3,361,264.20, with an increase in operating expenses of $1,868,142.07, making the increase in net earnings $1,493,122.13. Interest on mortgage bonds in 1882 $4,786,053.50; do. in 1881, $4,127,389.12—increase, $658,665.38. Number of passengers carried in 1882, 3,956,814; tons of freight moved, 5,127,767.

The gross earnings of the Nashville, Chattanooga and St. Louis Railway for the month of March, 1883, were $206,163.90, the operating expenses $115,664.48, and the net earnings $90,499.42; for the month of March, 1882, the earnings were $177,336.15, the expenses $94,397.44, and the net earnings $82,938.71—showing an increase in gross earnings of $28,827.75, with an increase in expenses of $21,267.04, making the increase in net earnings $7,560.71. For the nine months ending March 31, 1883, the gross earnings were $1,780,347.66, the operating expenses $987,689.06, and the net earnings $729,658.60—an increase, compared with the corresponding period of the previous year, of $151,691.19.

The gross earnings of the Chicago, Burlington and Quincy Railroad Company for the month of March, 1883, were $2,347,088.66, the expenses $960,073.18, and the net earnings $1,387,015.48; for the month of March, 1882, the gross earnings were $1,566,217.08, the expenses $929,200.24, and the net earnings $637,016.84—showing an increase in gross earnings of $780,871.58, with an increase in expenses of $30,872.94, making the increase in net earnings $749,998.64. The increase in freight earnings was $671,722.03, and in passenger earnings $122,690.03. For the first three months of the current fiscal year (January 1 to March 31, 1883,) the net earnings were $2,917,135.61, against $2,018,930.40 for the corresponding period of the previous year, an increase of $898,205.21.

The gross earnings of the New York, Lake Erie and Western Railroad Company for the month of February, 1883, were $1,283,615.59, the working expenses $1,049,815.60, and the net earnings $233,799.99; for the month of February, 1882, the gross earnings were $1,304,757.54, the working expenses $1,013,057.39, and the net earnings $291,700.15—showing a decrease in gross earnings of $21,141.95, with an increase in working expenses of $36,758.21, making a decrease in the net earnings of $57,900.16. From October 1, 1882, to February 28, 1883 (being the first five months of the current fiscal year), the gross earnings were $8,137,722.17, the working expenses $5,757,071.81, and the net earnings $2,380,650.30; for the corresponding period of the previous year the gross earnings were $7,725,297.71, the working expenses $5,604,172.16, and the net earnings $2,121,125.55—showing an increase in gross earnings of $412,424.46, with an increase in working expenses of $152,899.71, making the increase in net earnings $259,524.75.

The gross earnings of the Richmond and Danville system for the month of March, 1883, were $352,414, the operating expenses $178,491.67, and the net earnings $173,922.33; for the month of March, 1882, the gross earnings were $339,466.72, the operating expenses $226,541.91, and the net earnings $112,924.81—showing an increase in gross earnings of $12,947.28, with a decrease in operating expenses of $48,050.24, making the increase in net earnings $60,997.52.

The earnings of the Union Pacific Railway for the month of February, 1883, were $1,743,206.70, the expenses $1,068,737.90, and the surplus $674,468.80; for the month of February, 1882, the earnings were $1,835,620.15, the expenses $1,312,223,35, and the surplus $523,396.80—showing a decrease in earnings of $92,413.45, with a decrease in expenses of $243,485.45, making an increase in the surplus of $151,072.

The anthracite coal tonnage of all the carrying companies for the month of March amounted to 2,375,512 tons, being an increase, as compared with the corresponding month last year, of 267,469 tons. This tonnage was made up of the following shipments: Philadelphia and Reading Railroad, 536,489 tons; Lehigh Valley, 509,061; Central Railroad of New Jersey, 366,061; Delaware, Lackawanna and Western, 371,132; Delaware and Hudson Canal, 267,799; Pennsylvania Railroad, 189,578; Pennsylvania Coal Company, 105,592; New York, Lake Erie and Western Railroad, 30,800. The total tonnage for the three months of 1883, as compared with the corresponding period in 1882, shows an increase of 858,338 tons. The stock of coal on hand at tidewater shipping points on March 31, 1883, was 598,192 tons—an increase during the month of 22,427 tons.

The State of New York has purchased for the Sinking Fund $500,000 New York City 5 per cent stock and $500,000 District of Columbia 3-65s. The former will net to the State about 3½ per cent. per annum and the latter about 3¼ per cent, or a fraction more than would have been obtained by investing in United States 4 per cent bonds.

The directors of the North River Construction Company have now called the entire capital stock of $10,000,000, and give notice that there still remains $300,000 unpaid, and that unless the said amount is paid on or before May 21 the subscriptions will be forfeited.

The annual report of the Atchison, Topeka and Santa Fe Railroad shows the gross earnings for 1882 to be $14,733,000; expenditures, $8,637,000; net earnings, $6,136,000. The net increase over 1881 is $1,088,000.

The estimated earnings of the Gulf, Colorado and Santa Fe Railway for the month of March, 1883, was $141,104.37, mileage 482; March, 1882, $78,985.02, mileage 373—increase, $62,119.35; increase in mileage 109. Estimated earnings for three months, ending March 31, 1883, $436,708.75. Estimated earnings for three months, ending March 31, 1882, $262,013.93—increase, $174,684.82.

The annual report of the Panama Railroad Company, which was presented at the meeting of the stockholders on the 9th inst., showed that the gross earnings of 1882 from all sources were $2,454,345.80, and the gross expenses $1,431,810.51, leaving

a net profit of $1,082,535.29. New locomotives, cars, etc., have been purchased at a cost of $19,734 97. The treasurer's statement shows that the assets of the company are $4,326,929.08, and the liabilities $813,941.32.

The latest recorded sales of stocks and bonds at the New York, Philadelphia, Boston and Baltimore Stock Exchanges are as follows:

NEW YORK.

Albany and Susquehanna, 130¼; do. 1st, 112; do. 2d, 103¼; Adams Express, 130; American Express, 91¾; American Cable, 66; Arkansas 7s, Central R. R. issue, 22; do, L R., P. B. & N. O., 51; Allegheny Central, 20; Alabama, Class A, 83; Am. Dock and Imp. 5s, 88½.

Boston and New York Air Line pref., 80; Burlington. Cedar Rapids and Northern, 82; do. 1st, 101¾; Buffalo, New York and Philadelphia 1st, 101⅜; Buffalo, New York and Erie 7s, new, 120½.

Chicago and Alton, 135; do. S. F., ₹14⅛; do. 1st, 118½; Chicago, St. Louis and Pacific, 22; do. pref., 56; Canadian Pacific, 59¾; Chicago and Eastern I linois 1st, 99; Canada Southern, 67⅝; do. 1st, guar., 98⅛; Central of New Jersey, 76¼; do. consol. ass., 113; do. conv. ass., 113; do. 1st, 1890, 116; do. adj., 107; do. inc., 87; Central Pacific, 76⅜; do. gold bonds, 114¼; do. San Joaq. Br., 108¼; do. Cal. & Or. Br., 103½; Chicago and Northwestern, 134¾; do. pref., 152; do. S. F. 5s, 100¼; do. consol. 7s, 131½; do. 1st mort., 105½; Chicago, Milwaukee and St. Paul, 102⅞; do. pref., 120; do. Chicago and Pacific Western div. 1st, 94½; do. Southern Minn. div. 1st, 107¾; do. H. & D. div. 1st, 119; do. La Crosse div. 1st, 12c; do. 8s, 132; do. I. & M. div. 1st, 121⅛; Chicago, St. Paul, Minneapolis and Omaha, 49½; do. pref., 107; do. consol., 108¾; Cleveland and Toledo, S F., 106½; Chicago, Burlington and Quincy, 126⅜; do. 7s, consol., 123; do. Denver div. 4s, 1922, 84¾; Cairo and Fulton 1st, 109¼; Columbus, Hocking Valley and Toledo, 1st, 84; Chicago, Rock Island and Pacific, 123½; do. 6s, 1917, 124½; Chicago, St. Louis and New Orleans 5s, 104⅝; Cleveland, Columbus, Cincinnati and Indianapolis, 75; do. consol,, 122; Columbus, Chicago and Indiana Central, 51¼; do. inc. reorganization certif., 74; Columbia and Greenville pref., 59½; Consolidation coal, 26; Colorado coal and iron, 37; do. 1st, 85; Chesapeake and Ohio, 21¼; do. 1st pref., 32⅛; do. 2d pref., 24⅜; do. 1st mort., Series A, 107⅞; do. B, 92¼; do. 6s, 1911, 106; do. currency 6s, 52¾; Cleveland and Pittsburgh, 134; do. 7s, consol. S. F., 126½; Central Iowa, 25; do. 1st, 108½; Cedar Falls and Minnesota, 15.

Delaware, Lackawanna and Western, 127¼; Delaware and Hudson Canal, 110¾; do. 1st, Penn. div., 125; do. 7s, 1894, 115; do. 1884, 103¾; Denver and Rio Grande, 48⅝; do. 1st, 114; do. 1st consol., 97½; Dubuque and Sioux City, 85; Denver, South Park and Pacific 1st, 99.

East Tennessee, Virginia and Georgia, 10¼; do. pref., 21½; do. 5s, 75¾; do. inc., 37¼; do. 1st, 117; Elizabethtown, Lexington and Big Sandy 6s, 94½; Evansville and Terre Haute 1st, 98⅝.

Fort Worth and Denver 1st, 72.

Galveston, Harrisburg and San Antonio 1st, 104; Green Bay, Winona and St, Paul, 9¼; do. 2d inc., 25; Great Western 2d, 102½; Georgia State 7s, gold, 115½; Gulf, Colorado and Santa Fe 1st, 113¼.

Houston and Texas Central, 75½; do. 1st M. L., 109; do. Waco and N. W. div. 1st, 115; Hannibal and St. Joseph, 41⅛; do. pref., 93; do. 8s, consol., 105; do. 6s, consol., 109; Houston, East and West Texas 1st, 101.

Indianapolis, Decatur and Springfield 1st, 100; Illinois Central, 146; Illinois Leased Line, 80½; Indiana, Bloomington and Western, 33⅛; do. 1st, 88; International and Gt. Northern 1st, 110¾; do. coupon 6s, 83.

Keokuk and Des Moines 1st, 103½; Kansas Pacific 1st consol., 101¾; do. 6s, 1896, 110; do. inc., 102¼.

Louisville, New Albany and Chicago, 54⅞; do. 1st, 101½; Lake Shore and Michigan Southern, 111⅝; do. div. bonds, 119; do. 1st. reg., 124; do. 2d consol., 121¼; Lake Erie and Western, 30½; do. inc., 40; do. consol. ass., 104; do. 1st, 100; Long Island, 67; do. consol. 5s, 95; Lehigh and Wilkesbarre 1st guar., 115¾; do. consol. ass., 104; Louisville and Nashville, 53¾; do. N. O. & Mobile div. 1st, 93½; do. Gen'l mort. 6s, 96; do. Nashville and Decatur 1st, 115; do. consol. 7s, 115½; Lafayette, Bloomington and Muncie 1st, 100; Louisiana consol., 64¾.

Metropolitan Elevated Railway, 81; do. 1st, 99½; do. 2d, 88; Manhattan Beach, 23½; Manhattan Railway, 41; do. 1st pref., 82; Memphis and Charleston, 44; Michigan Central, 94½; do. 7s, 125¾; Minneapolis and St. Louis, 28¾; do. pref., 60; do. Iowa Ext. 1st, 117; Missouri, Kansas and Texas, 31⅛; do. consol. 7s, 108; do. 2d, 61⅛; do. gen'l mort. 6s, 83½; Missouri Pacific, 104⅝; do. 1st consol., 107; do. 3d, 117½; Milwaukee, Lake Shore and Western, pref., 44½; do. 1st, 101; Mobile and Ohio, 17; do. 1st deben., 77; Morris and Essex, 125; do. 2d mort., 112¾; do. 1st consol., 124; do. 7s, 1871, 120½; Mutual Union Telegraph, 20⅛; do. 6s, 89; Maryland Coal, 15; Milwaukee and Northern 1st, 94; Michigan Southern S. F., 107¼.

New York Central and Hudson River, 125⅞; do. 6s, 1883, 106; do sub. 6s 102½; do. 6s, 1887, 107¾; do. 1st mort. coupon, 131; New York, Lake Erie, and Western, 37⅜; do. new 2d consol., 98¼; do. new 2d 5s, funded, 97; do. 2d mort., 108; do. 7s, consol. gold, 127; do. 4th mort., 106⅛; New York and New England, 42½; New York, New Haven and Hartford, 178; New York City & Northern Gen'l mort., 47½; New York, Ontario & Western, 27¾; Norfolk & Western pref., 43¾; do. gen'l mort., 103⅛; Northern Pacific, 50⅞; do. pref., 87¼; do. 1st, 106; New Orleans Pacific 1st, 89; New York, Lackawanna and Western, 88¾; do. 1st, 116; New York and Harlem, 195; New York Elevated 1st, 117; Nashville, Chattanooga and St. Louis, 57; New York, Chicago and St. Louis, 12; do. pref., 29; do. 1st, 98¼; New Central Coal, 13⅛; New Orleans and Pacific 1st, 89; North Missouri 1st, 120; New York, West Shore and Buffalo 1st, 78⅞.

Ohio and Mississippi, Springfield div. 1st, 118⅜; Oregon Improvement, 85¾; do. 1st, 92; Ohio Central, 12⅛; do. inc., 31⅛; do. 1st, 88½; Ohio Southern, 13; do. 1st, 84; Oregon Transcontinental, 83; do. 1st, 95½; Ohio and Mississippi, 35; do. 2d, 122½; do. consol. S. F., 117⅞; Oregon Railway and Navigation, 140; do. 1st, 107¼; Oregon Short Line, 25½; do. 6s, 99¼.

Peoria, Decatur and Evansville, 21¼; Philadelphia and Reading, 55¾; Pullman Palace Car Co., 125⅛; Pacific Mail, 41¾; Pennsylvania Co. 4½s, 96¼; Pittsburgh, Fort Wayne and Chicago, 135½; Pacific of Mo. 1st, 106.

Quicksilver, 8½; do. pref., 44¾.

Richmond and Danville, 63; do. deben., 67½; do. 1st, 96¼; Richmond, Danville and West Point, 34⅞; Rochester and Pittsburgh, 20¼; do. 1st, 106; do. inc., 46; Richmond and Alleghany, 13⅞; do. 1st, 79½; Rome, Watertown and Ogdensburg, 34; do. 5s, ext., 68½; do. inc., 43½; Rensselaer and Saratoga, 143½.

Syracuse, Binghamton and New York 1st, 123; St. Louis, Alton and Terre Haute, 70; do. pref., 102; do. 2d pref., 106; do. 1st mort., 113; do. inc., 106; St. Louis and San Francisco, 33; do. pref., 52¾; do. 1st pref., 9⁷; do. 2d, Class B, 100; do. C, 99¾; do. gen'l mort., 99⅝; St. Paul and Duluth, 38; do. pref., 96½; St. Paul, Minneapolis and Manitoba, 123¾; do. 1st, 109; do. 2d, 110; do. Dakota Ext. 1st, 111½; South Carolina, 27½; do. 1st, 104⅜; do. 2d, 94½; do. inc., 66; South Pacific of Mo. 1st, 104½; St. Louis and Iron Mt. 1st, 115; do. 2d, 111; do. 5s, 78; do. Cairo, Ark. and Texas 1st, 109½; do. Arkansas Br. 1st, 110⅞; Southern Pacific of Cal. 1st, 103½; St. Paul and Sioux City 1st, 110¼; St. Louis, Kansas City and Northern, Omaha div. 1st, 110.

Tennessee 6s, old, 42; do. compromise bonds, 46½; Texas and Pacific, 40⅛; do. income L. G., 65; do. consol. 6s, 95¼; do. Rio Grande div. 1st, 83¼; Texas Central S. F. 7s, 108; Toledo and Wabash 1st, 108; do. 2d, 102½; do. St. Louis div. 1st, 102½; do. consol., 97½; Toledo, Peoria and Western 1st. 107.

United States 4½s, 1891, coupon, 113¼; United States 4s, 1907, coupon, 119⅝; do. 3s, reg., 103⅜; Union Pacific, 97¾; do. 1st, 114¾; do. S. F. 8s, 116¾; do. L. G., 107½; United States Express, 60.

Virginia Midland, 31½; do. inc., 61½.

Wabash, St. Louis and Pacific, 29⅛; do. pref., 48; do gen'l mort. 6s, 82; do. Havana div. 1st, 87; Western Union Telegraph, 82½; do. 7s, 1900, 114¾; Wells Fargo Express, 124½; Western Pacific bonds, 111; Winona and St. Peter 2d, 123.

BOSTON.

Atlantic and Pacific blocks, 107½; do. 6s, 95⅛; do. inc., 24½; Atchison, Topeka and Santa Fe, 83⅜; do. plain 5s, 84; do. 7s, 119½; do. L. G. 7s, 112; do. 6s, 97½; Atchison R. R. guar., 112; do. 4½s, 84.

Boston and Maine, 166; Boston Water Power Co., 4½; Boston Land Co., 6¾; Boston and Albany, 178¼; Boston, Hartford and Erie 7s, 45½; Boston and Lowell, 90; Boston and Providence, 165½; Burlington and Missouri River in Nebraska 6s, non-exempt, 102½; do. exempt, 113½, do. L. G. 7s, 116½.

Chicago, Milwaukee and St. Paul, Dubuque div. 6s, 102¾; Connotton Valley, 2¼; do. pref., 3¼; do. 5s, 22½; do. 6s, 20; Central of Iowa, 6; Calumet and Hecla Mining Co., 233; Chicago and West Michigan, 56; Chicago, Burlington and Quincy, 126½; do. 7s, 125⅝; do. 4s, old, 86⅜; do. 5s, 102; do. Denver Ext. 4s, 83½; do. S. W. div. 4s, 79; Cedar Rapids and Missouri River, 105¼; do. 7s, 121; Connecticut and Passumpsic Rivers R. R., 88; Cincinnati, Sandusky and Cleveland, 24; do. 7s, 102½; Cheshire pref., 59.

Detroit, Lansing and Northern, 80; do. pref., 112; do. 7s, 118.

Eastern, 45½; do. 6s, 112½;

Flint and Pere Marquette, 25¼; do. pref., 99½; Franklin Mining Co., 10½; Fitchburg, 124½.

Iowa Falls and Sioux City, 85; do. 7s, 119¾.

Jackson, Lansing and Saginaw 8s, green, 113.

Kansas City, Lawrence and Southern 6s, 104½; Kansas City, St. Joseph and Council Bluffs 7s, 111; Kansas City, Fort Scott and Gulf pref., 118; do. 7s, 111; Kansas City, Springfield and Memphis blocks, 99¾.

Louisiana and Missouri River, 16½; do. pref., 35; Little Rock and Fort Smith, 32⅛; do. 7s, 92.

Mexican Central, 19¾; do. 7s, 73⅛; do. inc., 21½; do. block No. 4, 98; Marquette, Houghton and Ontonagon, 51¾; do. pref., 111; Massachusetts Central 6s, 24¼; Metropolitan Horse R. R., 68½; Maine Central, 93.

Northern R. R., 112; New York and New England, 41¼; do. 7s, 114¾; do. 6s, 106¼; New Mexico and Southern Pacific 7s, 113¼; Nashua and Rochester, 54; Norwich and Worcester, 158.

Old Colony, 138; do. 6s, 117; Osceola Mining Co., 23; Oregon Short Line 6s, 99¼.

Pullman Palace Car, 125; Portland, Saco and Portsmouth, 107; Pueblo and Arkansas Valley 7s, 113; Philadelphia, Wilmington and Baltimore, 63.

Quincy Mining, 45¼.

Republican Valley 6s, 102; Rutland, 3½; do. pref., 20; do. 5s, 64; do. 6s, 95½.

Sonora 7s, 103½.

Toledo, Cincinnati and St. Louis, 4; do. 6s, 47; Toledo, Delphos and Burlington M. L. inc., 12¾; do. Branch inc., 12.

Vermont and Massachusetts, 131.

Wisconsin Central, 23¼; do. pref., 30½; do. 7s, 2d Series, 52; Worcester and Nashua, 57.

PHILADELPHIA.

Allegheny Valley Income 7s, 44¾; do. Scrip, 43; do. 7-30s, 123; American Steamship Co. 6s, 105.

Buffalo, New York and Philadelphia, 16⅛; do. pref., 30¼; Belvidere Delaware 2d, 103¾.

Camden and Amboy mort. 6s, 1889, 117; Central Transp., 35¼; Connecting R. R. 6s, 118; Catawissa, 22½; do. 1st pref., 59; do. 2d pref., 57.

Delaware Division Canal, 43⅛; Delaware and Bound Brook 7s, 124¾.

Erie and Western Transp. Co., 50⅛; East Pennsylvania, 51.

Huntingdon and Broad Top Mt., 15; do. pref., 29½; do. consol. 5s, 86½; Harrisburg City 6s, 102.

Junction 2d Mort. 6s, 115.

Little Schuylkill, 60¼; Lehigh Valley R. R., 66; do. 1st mort. 6s, 122; do. 7s, 134; do. consol. mort. 6s, 124; Lehigh Coal and Navigation, 42⅞; do. 6s, gold loan, 113; do. 6s, 1884, 102; do. consol. 7s, 118½.

Minehill and Schuylkill Haven, 64

Northern Central, 56¾; do. 5s, series A, 99⅛; do. B, 95¼; do. 6s, 1885, 104; North Pennsylvania, 68¾; Norfolk and Western pref., 42¾; Nesquehoning Valley, 53¼.

Philadelphia and Erie, 20¾; do. 5s, 103¼; do. 7s, 112½; Philadelphia and Reading, 27¾; do. gen'l mort. 6s, 96⅜; do. scrip. 115; do. consol. mort. 7s, coupon, 125; do. adjustment scrip, 86¾; do. consol. 5s, 1st series, 79½; do. 2d series, 64; do. debenture 6s, 7c; do. gen'l mort. 7s, 103; do. conv. 7s, Jan., 1885 coupon, 58; Philadelphia and Reading Coal and Iron deben. 7s, 70; Pennsylvania R. R. 6s⅞; do. consol. 6s, reg., 12c; do. gen'l mort. 6s, 118; People's Passenger R. R., 10; Pittsburg, Titusville and Buffalo, 7s, 98; Philadelphia City 4s, 1894-'97, 107½; do. 1884, 102½; do. 6s, new untaxed, 1901, 123; do. 1890, 119; Philadelphia, Wilmington and Baltimore 4s, 94; Pennsylvania State 5s, 118; do. 4s, 1912, 117¼; Pennsylvania Co. 6s, 107; do. 4½s, 96; Pennsylvania Car Trust 5s, 100¼; Philadelphia, Germantown and Norristown R. R., 108; Philadelphia and Gray's Ferry Passenger R. R., 45; Pittsburgh City Compromise 5s, 110; do. Avenue 7s, 1885, 104¾; Philadelphia City Passenger Railway, 88½; Pennsylvania and New York Canal 7s, 1907, 125; Pittsburg, Cincinnati and St. Louis 7s, 121.

Schuylkill Nav., 7¾; do. pref., 16; do. 6s, 1907, 91; do. 6s, 1897, 107; Sunbury and Lewistown 7s, 112; Susquehanna Canal 6s, 64⅞; St. Paul and Duluth, 36¼; do. pref. 97; Steubenville and Indiana 6s, J. & J., 102; do. A. & O. 100¾;

Union Passenger Railway, 115; United Companies of New Jersey, 189¼; Union and Titusville 7s, 98.

West Jersey and Atlantic, 38; do 1st, 108; West Chester and Philadelphia 7s, 114½; West Jersey R. R., 50; do. 1st mort. 6s, 116.

BALTIMORE.

Atlanta and Charlotte Air-line, 67½; do. 1st, 108.

Baltimore and Ohio, 205; do. 1st pref., 130; do. 2d pref., 127; do. 6s, 1885, 103½; Baltimore City 6s, 1890, 113½; do. 6s, 1902, 126; do. 6s, 1886, 107¼; do. 6s, 1893, exempt, 116½; do. 5s, 1894, 113; do. 5s, 1885, 100¾; do. 5s, 1916, 122½; do. 4s, 1925, 111.

Columbia and Greenville 1st, 104½; do. 2d, 80½; Charlotte, Columbia and Augusta, 37; do. 2d, 99¾; Central Ohio, 50; do. pref., 53; do. 1st, 109; Cincinnati City 7.30s, J. & J., 132; Canton Land Co., 53; do. 6s, 110.

George's Creek Coal, 93.

Maryland State Defense 6s, 102¾; do. 5s, 1890, 103; Marietta and Cincinnati 1st, 131¾; do. 2d, 105¼; do. 3d, 53¾.

Northern Central, 56½; do. 6s, 1904, gold, 115; do. 6s, 1900, 114½; do. 6s, 1900, gold, 115½; do. 5s, series A, 100; do. B, 95½; North Carolina State consol. 4s, 78.

Ohio and Mississippi, Springfield div. 1st, 120.

Pittsburgh and Connelsville 7s, 122.

Richmond and Alleghany, 14¾; Richmond and Danville 6s, gold, 105½.

South Side (Va.) R. R. 2d, 102.

Union Railroad 6s, 118.

Virginia and Tennessee 6s, 101½; Virginia Consols, 37; do. consol. coupons, 48; do. do. old, 54¾; Virginia new 3s, 53¼; Virginia Peelers, 37⅛; do. coupons, 43; Virginia 10-40s, 33½; do. 10-40 coupons 48; do. old, 55; Virginia Midland 1st mort., 111; do. 2d mort., 107½; do. 5th mort., 95; do. inc., 59¼.

Wilmington and Weldon, 121½; Wilmington Columbia and Augusta, 110⅞; Western Maryland, 14.

THE LAKE SHORE AND MICHIGAN SOUTHERN RAILWAY COMPANY.

TREASURER'S OFFICE,
GRAND CENTRAL DEPOT,
NEW YORK, March 27, 1883.

THE BOARD OF DIRECTORS of this company have this day declared a QUARTERLY dividend of TWO PER CENT upon its capital stock, payable on TUESDAY, THE FIRST DAY OF MAY NEXT, at this office.

For the purpose of this dividend, and also for the annual meeting of the stockholders for the election of directors, etc., which is to be held on the 2d day of May next, the transfer books will be closed at 3 o'clock P. M on Friday, the 30th inst., and will be reopened on the morning of Friday, the 4th day of May next.

F. W. VANDERBILT,
Acting Treasurer.

NEW INVENTIONS.

TO INVENTORS AND PATENTEES.

THIS department is devoted to the notice, consideration and description of new and valuable inventions applicable to Railroads, Steam Navigation, Machinery, Manufactures, Mining and Tramways. New patents of this description appearing in the weekly Official Gazette of the Patent Office are duly noticed in our columns, and full descriptions of those most useful and important are published *free of charge*.

☞ Inventors, Patentees, and the holders of Patents are requested to forward us their claims and specifications, with description of their inventions for our examination with a view to their publication in this department. Descriptive cuts, diagrams, and illustrations of the same are also desired.

☞ In selecting inventions for full description in this department, the editor will be guided solely by their importance and value, and their interest to the readers of the AMERICAN RAILROAD JOURNAL.

List of Patents for Inventions Relating to Railways, Tramways, Machinery, Etc.

BEARING DATE OF MARCH 27, 1883.

274,458. Stock-Car: George D. Burton and Joel M. Holden, Boston, Mass. Filed Nov 6, 1882.

274,463. Car-Starter: Arra F. Clark, Boston, Mass. Filed Sept. 16, 1882.

274,480. Rotary-Engine Locomotive: Isaac Newton Forbes, Lawrence County, Dak. Filed July 26, 1882.

274,482. Furnace for Locomotive and other Boilers: John A. Gano, Cincinnati, Ohio. Filed Aug. 11, 1882.

274,505. Underground Cable-Way: Almerin H. Lighthall, San Francisco, Cal. Filed Nov. 18, 1882.

274,511. Car-Coupling: Phineas E. Merihew, Fairhaven, Mass. Filed Jan. 30, 1883.

274,512. Regulating-Valve: Patrick O'Reilly, New York, N. Y. Filed Aug. 14, 1882.

274,530. Cut-Off Valve for Steam-Engines: John M. Sweeney, Wheeling, W. Va. Filed Nov. 21, 1882.

274,553. Governor for Steam-Engines: Mathias I. Beaudreau, Fond du Lac, Wis. Filed Aug. 18, 1882.

274,559. Cut-Off Mechanism for Steam-Engines: Nathan F. Burnham, York, Pa. Filed Jan. 25, 1883.

274,561. Feed-Water Heater: George Cassady, Flint, Mich. Filed Nov. 14, 1882.

274,565. Planing-Machine: Ilen P. Creque, New York, N. Y. Filed Aug. 24, 1882.

274,569. Car-Coupling: Clarence B. Cutler, Schodiack, N. Y. Filed Dec. 4, 1882.

274,571. Slide-Valve for Compound Engines: Edward G. Davis, St. Louis, Mo. Filed Jan. 22, 1883.

274,585. Stock-Car: Montrose H. Gilbert, Smithville, Ohio. Filed Oct. 17, 1882.

274,593. Rail-Joint: Charles F. Hartman, Keller's Church, Pa. Filed June 28, 1882.

274,609. Rail-Lifter: Frank Jackson and Edward R. Austin, Manchester, County of Lancaster, assignors to William Righter Comings, London, England. Filed Jan. 22, 1883. Patented in England Oct. 28, 1880, No. 4,399.

274,621. Ticket-Holder for Car-Seats: Crowell S. Macann, Rahway, assignor of one-half to Alexander Cook, Newark, N. J. Filed May 12, 1882.

274,625. Governor: William B. Mason, Boston, assignor of one-half to William A. Perry, Brookline, Mass. Filed Jan. 11, 1883.

274,635. Railway Safety-Alarm: William B. Morris, San Francisco, Cal. Filed Oct. 30, 1882.

274,643. Railway-Switch: Jos. Murphy, San Jose, Cal. Filed Feb. 18, 1882.

274,645. Car-Coupling: Carl F. A. Neitzel, Concordia, Kans. Filed July 31, 1882.

274,647. Steam-Actuated Valve: John P. Northey, Toronto, Ontario, Canada. Filed Dec. 28, 1882.

274,659. Tool for Cutting Slots in Rails: James K. Polk, Renfroe, Prentiss, Ga, Filed Dec. 5, 1882.

274,669. Rotary Engine: John L. Starks, Sharon Grove, Ky. Filed Jan. 29, 1883.

274,689. Sleeping-Car: William H. Wigmore, Philadelphia, Pa., assignor of one-half to John H. Doerr, same place. Filed July 19 1882.

274,713. Railroad-Switch Adjusting and Locking Device: Reese G. Brooks, Scranton, Pa. Filed Jan. 9, 1883.

274,738. Car-Brake: James M. De Witt, Greeley, Colo., assignor to himself, James W. McCreery, and Samuel F. McCreery, all of same place. Filed Dec. 30, 1882.

274,749. Car-Coupling: Samuel J. Filson, Maysville, Ky. Filed Feb. 28, 1883.

274,753. Car-Heater: Willard M. Fuller, New York, N. Y., assignor to Cyrus Pyle, Brooklyn, N. Y., and Daniel Eldridge, New Brunswick, N. J. Filed Dec. 1, 1882.

274,755. Lubricating Journal-Bearings: James Garland and James Kenyon, Lynchburg, Va. Filed Jan. 22, 1883.

274,756. Boiler-Flue Scraper: William Alfred Gay, Buffalo, N. Y., assignor of one-half to John Otto, same place. Filed Jan. 10, 1883.

274,764. Car-Coupling: Thomas Harding, Lafayette, Ind. Filed Jan. 23, 1883.

274,767. Automatic Car-Brake: Gustavos Heidel, St. Louis, Mo. Filed Jan. 22, 1883.

274,786. Cinder-Car: William Kelly, Scottdale Pa. Filed Dec. 19, 1882.

274,787. Safety-Valve: Alden D. Kilborn, Tucson, Ariz. Filed Jan. 15, 1883.

274,794. Shaft-Hanger: Walter J. F. Liddell, Charlotte, N. C. Filed Feb. 10, 1883.

274,796. Shaft-Coupling: August Loehner, St. Louis, Mo., assignor to Loehner & Wolff, same place. Filed Mar. 29, 1881.

274,805. Railway-Car: Edward B. Meatyard, Geneva, Wis. Filed July 7, 1882.

274,808. Car-Coupling: Jacob D. Miller, York, Pa. Filed Oct. 5, 1882.

274,810. Valve-Gear for Steam-Engines: Alexander Morton, Glasgow, County of Lanark, Scotland. Filed Sept. 20, 1882. Patented in England March 28, 1882, No. 1,490.

274,814. Railroad-Switch: Simeon Nichols, Lisbon, Me, assignor of one-fourth to Charles W. Parker, Chicago, Ill. Filed Nov. 1, 1882.

274,815. Oil-Can: George C. Oram, Brooklyn, N. Y., assignor to himself and William H. Daly, Bergen Point, N. J. Filed Sept. 11, 1882.

274,824. Sectional Steam-Generator: David Renshaw, Boston, Mass. Filed Oct. 14, 1882.

274,825. Sectional Boiler: David Renshaw, Boston, Mass. Filed Oct. 12, 1882.

274,834. Lifting Mechanism: George A. Shoudy, Rockford, Ill. Filed Sept. 15, 1882.

274,847. Car-Coupling: Robert G. Thompson, White Cottage, Ohio. Filed Feb. 13, 1883.

274,854. Steam-Boiler Furnace: Bernard Topmiller, Cincinnati, Ohio, assignor of one-half to Simon Obermayer and Jacob Heinzheimer, same place. Filed June 23, 1882.

274,856. Rolling-Mill: Richard Uren, Houghton, Mich. Filed Dec. 8, 1882.

274,867. Spark-Arrester: Anthony Waterman and Frederick L. Waterman, Boston, Mass. Filed Nov. 1, 1882.

274,869. Car-Brake: Simon P. Weller, Silvanus Wance, and George Roesch, Denver, Colo., assignors of one-fourth to August Rische and Carl A. Funke. Filed Jan. 5, 1883.

274,889. Manufacture of Iron and Steel: James Henderson, Bellefonte, Pa. Filed Sept. 27, 1882. Patented in England Nov. 8, 1870, No. 2,940.

274,890. Dumping-Car: Callax La Cosse, West Bay City, Mich. Filed Dec. 2, 1882.

BEARING DATE OF APRIL 3, 1883.

274,893. Car-Coupling: Arthur H. Armstrong, Plainville, Conn. Filed Jan. 4, 1883.

274,896. Car-brake shoe: Herbert A. Banning, New York, N. Y. Filed Feb. 12, 1883.

274,908. Car-Coupling: B. W. Cloak, Dayton, Ohio, assignor of one-half to John Cloak, same place. Filed Nov. 20, 1882.

274,927. Station-Indicator: Samuel Forrester, Alleghany, Pa. Filed Oct. 30, 1882.

274,968. Injector: David Renshaw, Braintree, Mass. Filed Jan. 20, 1883.

274,991. Stock-Car: Stephen P. Tolman, Dunellen, N. Y. Filed Dec. 13, 1882.

274,994. Gage-Cock: Donald F. Tousey, Minneapolis, Minn., assignor of one-half to John F. Cauney, same place. Filed Aug. 8, 1882.

275,001. Nut-Lock: Theophilus Weaver, Harrisburg, Pa. Filed Dec. 5, 1882.

275,019. Pneumatic Railway-Signal: Edward Mason Chase, Boston, Mass. assignor to Ellis L. Motte, same place, and Horatio N. Glover, Milton, Mass. Trustees. Filed Mar. 27, 1882.

275,028. Railroad-Crossing: Edward Evans, Mansfield, Ohio Filed Oct. 23, 1882.

275,038. Railroad-Switch: Josiah Gray and Wesley Hollenback, Chicago, Ill., assignors to themselves, Connell B. Shefler, and Jacob R. Reed, all of same place. Filed Aug. 4, 1882.

275,039. Device for Depositing Torpedoes in Snow-Banks: George A. Gunther, Brooklyn, N. Y. Filed Jan. 4, 1883.

275,091. Safety Attachment for Boilers: Daniel Sullivan, Lincoln, R. I. Filed May 9, 1882.

275,096. Railway Track-Layer: John Turner, Grosse Isle, Mich. Filed Oct. 25, 1882.

275,115. Railroad-Switch: Abraham Ayers, New York, N. Y. Filed Dec. 15, 1882.

275,138. Car-Coupling: Newton Campbell, Elizabethtown, Ohio. Filed Jan. 17, 1883.

275,150. Car-Coupling: Daniel W. Coburn, Buffalo, Tex. Filed Feb. 21, 1883.

275,164. Curtain-Bracket for Sleeping-Cars: John H. Doerr, Camden, N. J., and William H. Wigmore, Philadelphia, Pa. Filed July 27, 1881.

275,175. Gage-Cock and Low-Water Detector: George L. Engelking, Pittsburg, Pa., assignor, by direct and mesne assignments, to William Starkey and George E. Williams, both of same place. Filed Jan. 27, 1883.

275,117. Car-Coupling: Emil C. Eyl, Jefferson City, Mont. Filed Aug. 31, 1882.

275,180. Electrical-Connector for Railway-Track Circuits: Stephen D. Field, New York, N. Y. Filed Jan. 16, 1882.

275,184. Valve: Henry R. Frisbie, Bridgeport, Conn. Filed Dec. 29, 1882.

275,188. Nut-Lock: Franklin Getz, Tonawanda, N. Y. Filed Feb. 6, 1883.

275,211. Car-Starter: Lewis W. Hewett, New York, N. Y., and Sumner J. Leonard, Williamsport, Pa., assignors to Philip B. Shaw, Williamsport, Pa. Filed May 2, 1882.

275,221. Stock-Car: Elias Kohler, York, Pa. Filed Nov. 9, 1882.

275,255. Electric Railway-Signal: Henry C. Nicholson, Mount Washington, Ohio. Filed Jan. 31, 1883.

275,256. Bar for Aligning Railway-Rails: Burnett J. Noonan, Fern Ridge, Mo. Filed Jan. 9, 1883.

276,301. Snow-Plow: Henry A. Webber, Rockton, Ill. Filed Dec. 2, 1882.

275,306. Car-Coupling: Benjamin F. Whitney, Eldon, Iowa. Filed Feb. 1, 1883.

275,313. Railroad Crossing and Station Signal: Wm. B. Wood, Bowling-Green, assignor of one-half to Lewis C. Garrigus, Russellville, Ky. Filed Oct. 7, 1882.

275,323. Car-Axle: Marcellus O. Baldwin, Kansas City, Mo., assignor of one-half to H. A. Dorr, same place. Filed Dec. 4, 1882.

275,324. Car-Axle: George W. Bedbury, Portland, Oreg., assignor of one-third to E. J. Haight and L. M. Cox, both of same place. Filed Dec. 9, 1882.

Parkhill's Watch Tower and Signal Lantern.

THE inventor of the new and ingeniously devised watch tower and signal lantern best designated by his name, is MR. CLAIR S. PARKHILL, of Hornellsville, N. Y., who has secured letters patent for the protection of his rights therein.

His invention relates to new and useful improvements in watch towers and signal lanterns, to prevent accidents at railroad crossings and other dangerous places, and consists in novel features of construction, combination and arrangement of parts.

The lantern or turret in Mr. Parkhill's invention stands on the top of the tower, and is supported and turned around by means of a pivot which extends through the ceiling of the watchman's coop. A lever is firmly secured to the lantern, which may be supported by four rollers run on a track on the floor. The sheet-iron frame of the lantern rests on arms which are bent to allow the turret or lantern to revolve sufficiently far to present or expose at will either the word "Danger" or "Safety" without the possibility of the arms hitting a gas-pipe which passes from the coop below to the turret above.

The watchman's coop is reached by means of a ladder, through a trap-door raised and held open by means of a spring, and which, after the watchman has entered his coop, is closed and fastened in a position even with the floor, so that it can be walked upon. A trap-door in the ceiling of the watchman's coop opens downward and gives access to the turret. Inside the coop, directly overhead, is a lever—whose use will be explained presently—held at proper places by means of a spring bolt which catches into notches. Windows enable the watchman to see in every direction. Arrangements for his comfort are easily made by a small furnace in the compartments below the coop or by means of a gas-stove within it.

Outside of the coop is a large gong, which is sounded whenever the turret is moved in any direction by means of the lever spoken of above as being inside the watchman's coop, directly overhead, and held at proper places by means of a spring bolt. Should the watchman need to sound the gong while the turret is stationary, he could do this by means of a crank inside the coop. Every emergency is thus provided for.

The room containing the ladder for the ascent of the watchman to his coop can be used for storing coal, flags and other things, and as a place of rest and shelter for switchmen. Of course, when the existence of this room would be needless and an impediment, the watchman's coop and the turret or lantern

above could be supported on iron columns made of sufficient height to enable the watchman to command an unobstructed view of trains coming from either direction.

We scarcely need add that an arm, beam, or any instrument to act as a gate across the street or sidewalk could be connected with the turret and lever working the gong, or either of them, and worked so as to be opened and closed, or raised and lowered by the watchman in the tower independently or with the turning of the turret and sounding of the gong.

The intention, simplicity and effectiveness of Mr. Parkhill's invention commend it to the attention of persons interested in the improvement of railroad construction.

Stewart's Switch and Signal Mechanism for Railways.

This device, patented recently, would be more exactly described as an arrangement of levers for the more perfect working of long distance signals, and also for combining these with switches. The signal (semaphore preferred) has a weighted lever, the weighted end attached and connected to the short end of the danger arm by a rod. The wire or cable pull is then attached to the other end of the weighted lever, is run around pulley in a frame below the lever and away to the operating lever, the distance required, where the chain-section of the pull passes around a pulley fastened at the lower end of the quadrant by a pin which serves for a fulcrum. The end of the chain section is supplied with a weight which keeps the pull tight always; if it expands the weight lowers, and if it contracts the weight rises, thus keeping the pull under constant tension. The weight of the lever end being heavier than the weight of the lever at the semaphore, the weighted end of said lever is kept raised and the signal arm at "safety" position. The invention comprises besides, on the same fulcrum, a pin with pulley, at the operating end of pull, and a lever adapted to grip the chain section. The excess weight being raised, the weighted end of the lever at the semaphore drops, and the "danger" arm is raised to the "danger" position. On reversing the operating lever it releases the pull and leaves it free for contraction or expansion, as before described.

Wm. C. Stewart, the inventor of the system briefly described, resides at Camden, N. J. He has prepared models of his invention for the coming Exposition of Railway Appliances to be held at Chicago. His ingenious mechanism was suggested by his observation of the trouble occasioned signal erectors by the expansion and contraction of the wire pulls of long distance semaphore signals, expansion causing the signal to not rise the proper height, an inconvenience temporarily regulated by means of screw buckles. The first cool spell would, in turn, contract the wire, and the consequence was it would break. To obviate these annoyances, Mr. Stewart invented his system of switch and signal mechanism, which, he claims, answers its purpose fully. By its means he can work one semaphore signal from twelve different switch levers, without these conflicting with each other, thus doing away with the signal levers, sliding plates and such appliances. By means of his invention Mr. Stewart claims that he can work twelve semaphores from one switch lever, with no more manual labor than working the switch alone; and also make any desired combination. These advantages, he believes, make his the most perfect interlocking switch and signal system that can be worked, especially in cases where distance signals are used. Practical railroad men acquainted with it, uniformly commend it as thoroughly adapted to its purposes.

We may add in the way of anticipation, that Mr. Stewart's model, before spoken of as for the Chicago Exposition, has the clutch or gripping and releasing levers short, and attached to the switch lever. For junction switch the two main line signals run over one pulley with release clutch attached to the two junction signals. Over another pulley is the same, except the one clutch to pull and the other to break off and release. While raising the excess weight of one pair the excess weight of the other pair of signals is pulling against the switch lever and thus forms a counter-balance of the signals, or, as it were, a scale beam, there being no more work to operate the switch and signals than operates the switch alone. As the track is set, so sets the signals, and it is impossible to work them otherwise.

Automatic Speed Indicator and Guard Lamp for Cars and Vessels.

THE great need of a train lamp which could be easily and quickly distinguished from "yard" and "switch" lights, hand lamps, etc., has long been felt by engineers and train men.

To supply this want and at the same time provide an accurate and simple speed indicator, a device has been invented which may be attached to the engine or any car, by which the lamp front is closed at regular intervals and instantly opened again, thus causing a series of flashes of light. The front of the lamp is provided with a moveable frame having two panes of colored glass, one above the other, say green and red. When the train moves forward green is automatically presented before the light, but as soon as motion is reversed, green drops and red is presented. The entire device is automatic, depending on no person for adjustment, and so arranged that if any accident should happen it will always assume the normal position of danger, "red."

The construction is as follows: To an axle of the car or engine are attached a gear-wheel and an eccentric. A jointed rod extends from the eccentric to the interior of the lamp and has at its upper end an adjustable paul. The front of the lamp is closed by means of a number of slats hung on pinions hung out of center and provided with weights to open them automatically. The adjustable paul acts on a ratchet-wheel, causing it to revolve one cog forward at each revolution of the car wheel; once in each revolution this cog wheel closes the slats and instantly releases them, thus causing a flash of light. By proportioning the number of cogs to the size of car wheel, a given number of flashes per minute will indicate a certain speed per hour, say thirty flashes per minute indicating thirty miles per hour; fifteen flashes per minute, fifteen miles per hour, etc. A rod having an adjustable cog at its lower end connects with the gear wheel; the upper end is fastened to the lamp frame having the colored panes of glass. When the train moves forward the frame is raised by the cog wheel and locks in that position; as soon as motion reverses, the adjustable cog is acted on in a reverse direction and the frame is unlocked and falls.

The usefulness of the device for river vessels and ferryboats at night must be apparent to all. For further information, address O. C. Knife, Norristown, Montgomery Co., Pa.

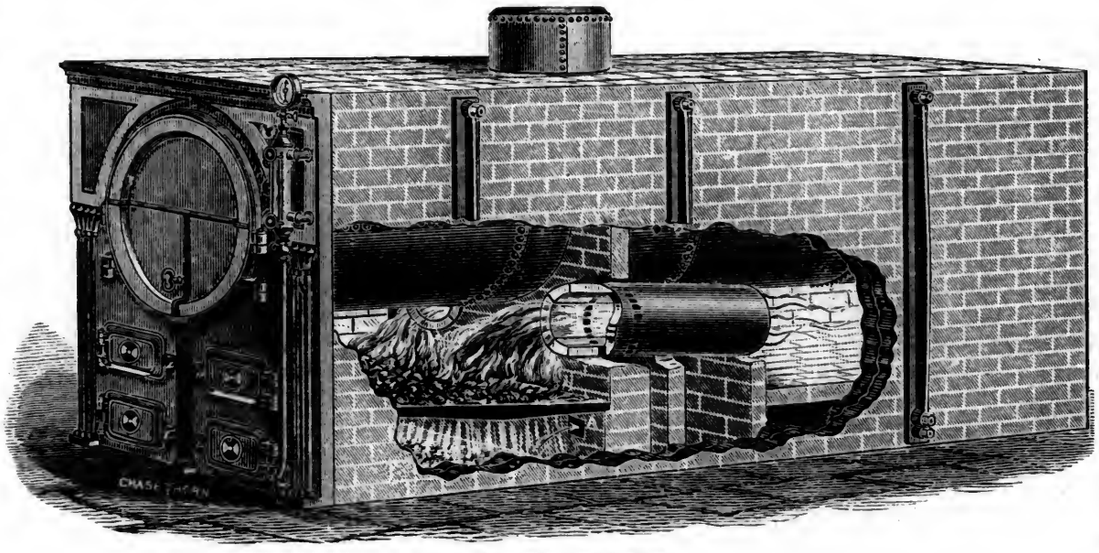
Railroad Crossing Gate.

THE gate for which the U. S. Patent Office issued patent to J. O. MCCUTCHAN, of Middlebrook, Va., dated Dec. 12, 1882, No. 269,084, may be considered an automatic, revolving gate. It consists of a horizontal square bar, or shaft, to which are attached vertical pickets which sustain sufficient strands of barbed wire so interlaced as to make a continuous barrier to the passage of stock through cuts or from field to field. The barbs on the wire are protected by guards of plate broader at base and perforated for the passage of the wire, or by double rods, joined elliptically, attached to the middle of the shaft. These guards also receive the shock of contact with engine or rear of train. The shaft is sufficiently weighted at the ends to counterbalance the gate when opened or thrown down by the passing train, thereby restoring it to its normal position. A three-quarter inch rod so bent that the two rear ends are inserted in loops above the pilot on the engine, with about two feet of the double

and front end protected with first a gum tube and then an iron tube over it, which, by striking the gate near the top against the guards is found to be sufficient to open the gate, and prevent any inclination to crash that striking low down with the pilot would have without it. The shaft is journalled where it passes under the rails, and the journals rest in boxes with open tops, and sides as high as the top of the journalled parts of the shaft, which allows the weight of the passing train to rest on the shaft and bind it so as to prevent it from raising. These boxes, with gate, can be adjusted to any cross-tie by sinking it in ballast the depth of the shaft and box, which should be about three inches.

Perfect Combustion and Prevention of Smoke.

THE Ritchie Furnace Company, of Chicago, have devised a furnace for steam boilers by which perfect combustion of fuel is obtained, and the formation of smoke prevented. It is a well-established fact that in ordinary furnaces the supply of oxygen derived from the atmosphere is not sufficient to insure the ignition of all the gases generated in the furnace chamber, and many of these volatile gases are carried off in a volume of smoke. To overcome this waste of inflammable material, the Ritchie Company furnish a device by which an additional supply of oxygen is brought in contact with the gases, causing their immediate combustion, and thereby preventing the formation of smoke. We furnish an illustration of the appliance with description of its construction and operation.



THE RITCHIE FURNACE.

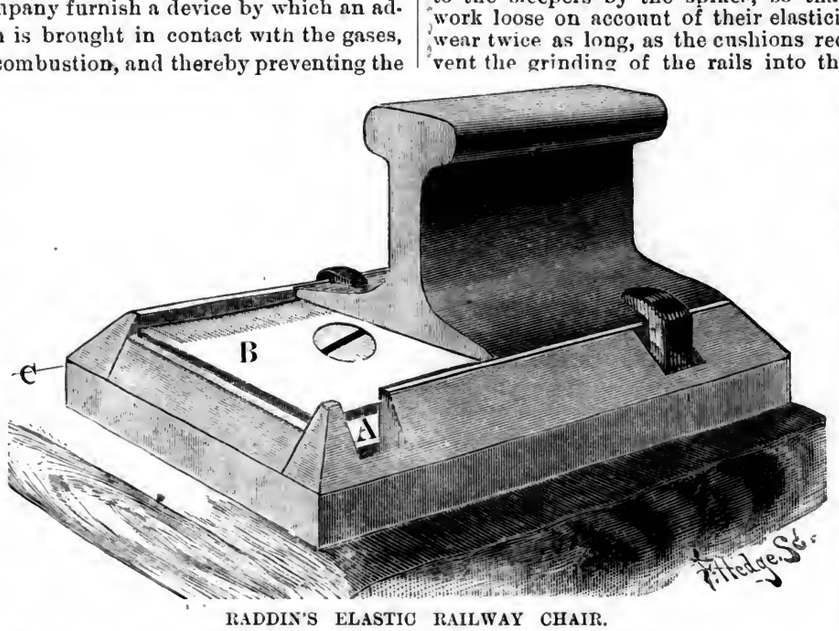
By reference to the cut it will be seen that the furnace is applicable to all ordinary tubular boilers, and consists in building the bridge-wall up to the boiler. This bridge-wall contains an air chamber, into which air is introduced through openings located beneath the grate bars. The air is then admitted into the annular combustion chambers (extending horizontally through the bridge-wall and constructed of fire clay tile) by means of a number of perforations, which produce the required diffusive action and the intimate mixture of the oxygen with the unconsumed gases, causing a perfect and complete combustion at a high temperature.

The important feature of this furnace is that the greatest intensity of heat, caused by the perfect combustion of the gases, is located within the annular combustion chamber, and has no direct contact with the boiler; and the action of the furnace diffuses the heat at a high temperature *equally*, and no furnace of this kind can cause the shell of the boiler to burn, blister or bag, by concentrating the intense heat directly to the shell of the boiler over the fire-box, or bridge-wall, as is the case with many other devices for a similar purpose.

Raddin's Elastic Railway Chair.

FULL information as to this improvement is given by Mr. John Raddin, of Lynn, Mass., to those who write for it. The following description of his chair cannot fail to be interesting to railroad men.

Its name indicates the leading peculiarity of the invention, namely, an elastic cushion, A, as in the cut, securely inclosed in the chair-bed by a covering plate, B, and bolted thereto to prevent the horizontal play of the cushion and keep out the air and dust.



RADDIN'S ELASTIC RAILWAY CHAIR.

The advantages of this construction are stated to consist in its preventing the hammering by the wheels absorbing the sound, and the displacement of the road-bed, thus giving an equal bearing on each sleeper and making the rail continuous; the rubber packing is believed to cause the rail to wear five times as long, as iron cannot be pounded with rubber under it, and the chairs and rails are firmly secured to the sleepers by the spikes, so that they are less liable to work loose on account of their elasticity; and the sleepers will wear twice as long, as the cushions receive the shock and prevent the grinding of the rails into the sleepers, thus keeping them from rolling and the spikes from working loose.

Chairs of this construction are obviously well adapted for elevated railroads and bridges. If screwed or spiked on every sleeper, they will absorb the jar, deaden the sound, and render the motion of the car noiseless.

THE Pennsylvania Railroad Company have been so well satisfied with the working of the signal system of the American Electric Railway Signal Company as applied on the Tyrone division of their road, that they have issued orders to run all trains on that division by that system.

IT is stated that the charge for third-class passengers per mile on the railways of India has been reduced to about one-half cent. The result has been a large increase in traffic, the poorer classes availing themselves more generally of the railways.

TRAMWAY DEPARTMENT.

[This department of the AMERICAN RAILROAD JOURNAL is devoted to the interests of Street Railways; and communications, suggestions and items of information relative to their organization, management and appliances are solicited by the editors. All communications should be accompanied by the name and address of the writer. The English nomenclature of "Tramway" is adopted in this department as being of greater convenience and more specific in its meaning than "street railway," though in allusion to individual organizations we shall preserve their corporate titles. It is our hope to nationalize the term Tramway, which is now generally used in every English speaking territory with the exception of the United States.]

THIS journal is the only one in the United States giving special attention, in a standing department, to the street-car interests. That hundreds of millions of dollars are invested in the means of street travel, and that every city of any size is provided with these means, are good reasons why, the vast and extensive character of the interest being considered, trustworthy information respecting it should be regularly printed and distributed. The management of the AMERICAN RAILROAD JOURNAL, taking precisely this view of the matter, began some months ago, and purpose to continue, the publication of news about street railroads in all parts of the continent and abroad, together with observations which they may deem it advisable to make. They seek encouragement in this as in other departments of the enterprise of which this journal is the expression. Information concerning street railroads, now existent or contemplated, is hereby earnestly requested both in the interest of this journal and of the roads themselves. It is desired that by means of the postal card or letter, matters about the finances, condition, management, and so forth, of street railroads, be sent to the editors; and expressions of opinion coming within the wide range of the subject indicated are also sought, for publication in the columns devoted to correspondence. Moreover, the multiplication of subscribers would be a certain means of enlarging and improving the department under consideration. Certainly, the larger the number of those who by their subscription, identify themselves financially with the proprietors, the more numerous will be the contribution of reading matter to the street railroad as to other departments. We accordingly invite co-operation by subscription as well as by written communication, and promise the best results possible to us, from both. While cheerfully and thankfully making our respectful acknowledgements to all who have co-operated with us in the past, we may be pardoned the re-mention of the value we should set upon the assistance of all in any way able to aid our intention to make the street-car department of this periodical one of its most valuable features.

OUR correspondent writing from Rochester, N. Y., is very respectfully reminded that Webster's definition of "tramroad" reads as follows: "A road prepared for easy transit of trains or wagons, by forming the wheel-tracks of smooth beams of wood, blocks of stone, or plates of iron." This definition unquestionably covers the use of the word "tramway" or "tramroad" as applied to street railroads. As it may be urged that it also covers the railroad, generally so called, meaning the way for the passage of the locomotive and cars, we may add that while this is true, it is also true that "railroad" used alone has the exclusive application as expressed above; and that the application of the word "tramway" or "tram-road" to all roads, constructed after the same or a similar manner, which are not "railroads" in the restricted sense stated, is highly convenient, including roads traveled by horse cars, mule cars, donkey cars, cable cars, etc. Our liking for the expression "tramway," as a really apt one, is thus easily defended; but we do not say that any other is not equally defensible, nor entertain the vain expectation that our preference will modify usage to any considerable extent. Hair-splitting about words is, moreover, not a profitable way of spending time and occupying space in these columns.

Union Passenger Railway Co. of Philadelphia.

THE earnings of the Union Passenger Railway Company for the year ending December 31, 1882, were from fares and tickets, $1,272,758.72; from manure, $17,937.65; from advertising, $1,437.50—total, $1,302,133.87; the expenses during the same time were $896,727.67, making the net earnings $405,406.20. From which deduct interest, $47,893.99, and rentals, $121,468.78, leaving $236,043.43. Out of which a dividend was paid in July, 1882, of $105,000, and another in January, 1883, of $120,000, leaving a balance of $11,043.43. The earnings, expenses and net earnings were apportioned as follows:

	Earnings.	*Expenses.*	*Net.*
Fairmount	$182,712.96	$131,783.81	$50,929.11
Poplar and Spring Garden sts	10,957.09	11,414.20	Loss 450.55
Richmond	198,037.35	144,431.85	53,605.50
Cedar street	4,341.40	4,226.78	114.62
Columbia Avenue	239,635.56	142,639.47	96,996.09
Jefferson street	73,250.45	57,029.35	16,221,10
Continental	169,628.45	104,433.69	65,194.76
17th and 19th sts	162,735.87	103,984.54	58,751.33
12th and 16th sts	85,762.00	63,500.93	22,261.07
17th and 18th sts	35,947.27	32,229.38	3,717.89
19th and 20th sts	40,716.02	22,587.79	18,128.23
Christian street	50,407.20	33,317.79	17,089.41
Susquehanna Ave	30,116.73	28,713.55	1,403.18
Night Line	17,884.92	16,434.54	1,450.38
Total, as above	$1,302,133.87	$896,727.67	$405,406.20

For the year ending December 31, 1881, the earnings were $1,229,523.85, the expenses $835,493.15, and the net earnings $394,030.70—showing an increase in earnings of $72,610.02, with an increase in expenses of $61,234.52, making the increase in net earnings $11,375.50.

The receipts of the Continental in 1882 were $499,137, against $454,571 in 1881, an increase of $44,566. The receipts of the Union in 1882 were $802,996, against $774,952 in 1881, an increase of $28,044. The President in his report says:

The past year has, taken altogether, been very prosperous. We have had largely increased expenses—in fact material and feed have been higher than at any time since the fares have been reduced from seven cents—but our business has grown equally fast and left us at the end of the year with increased profits, which have justified us in increasing our semi-annual dividend to a point that we are satisfied we can adhere to.

During the year we have laid a Cable railway on Columbia avenue, from the depot Twenty-third and Columbia avenue to East Park, in all nearly two miles, with machinery sufficient to propel the rope for an additional distance of four miles. We have also purchased a property on Sansom street, east of Ninth street, for the purpose of placing machinery in it to propel such line as we may feel justified in building down town.

We intend making a thorough trial of the portion now built, and should it prove satisfactory the Board will then cause to be built an extension from Twenty-third and Columbia avenue, on Columbia avenue to Seventh street, on Seventh, Franklin and Ninth streets to Market, and on Market to Front street. We entertain no doubt whatever of a successful result, in fact we expect to commence running as soon as we have a period of good weather long enough to get our machinery started.

The receipts from all sources during the year 1882 were $1,755,258.34, and the total expenditures were $1,638,788.27, leaving a cash balance at the end of the year of $116,470.07. The receipts comprised: cash at the commencement of the year, $96,989.59; fares and tickets, $1,272,758.72; manure, $18,417.35; capital stock—Union, $326,100; dividends—Continental, $15

000; advertising, $5,662.50; reduction in amount of feed and supplies, $20,330.18. The aggregate expenditures were: conductors and drivers, $231,742.67; wages, $38,285.31; hay, $82,893; straw, $9,404.09; corn, $134,040.17; oats, $3,448.37; rye, $9,448.58; bran, $7,207.54; real estate repairs, $4,868.90; car repairs, $53,003.84; street repairs, $47,750.05; harness, $5,558.16; stable labor and materials, $82,297.39; blacksmiths, $28,389.14; gas, $7,059.35; oil, $2,030.89; miscellaneous, $14,586.21; salaries, $19,818.96; royalty and detective, $5,960.99; printing and stationery, $4,573.56; rents, $137,945; insurance, $3,232.30; taxes, $55,704.50; damages, $6,668.65; horses, $37,401.88; interest, $47,893.99; dividends—Union, $192,500; Continental Passenger Railway Co., $1,500; Empire Passenger Railway Co., $250; Construction—Union, $47,831.94; equipment—Union, $64,226.65; real estate—Union, $33,091.70; Cable road, $146,663.31; stock, $35,072.75; loans, $30,000; profit and loss, $6,435.63.

The number of cars on hand at the commencement of the year was 280, and at its close 349; of which 326 were in good and 23 in bad condition. The number of horses on hand at the commencement of the year was 1,706, and at its close 1,713; the average number on hand during the year being 1,746. Number of sweepers, 23.

The receipts per mile run for a two-horse car with conductor and driver are given at 27.18 cents, and the cost per mile run at 18.72 cents. Receipts per car per day, $20.62; expenses, $14.53. The mileage of cars was 5,372,354. The number of passengers was 21,864,841; free, 440,654; transfers received, 10,920,682.

The receipts for the three years ending December 31, 1882 (including $45,000 for rentals), were $3,749,173.42; and the expenses (including $189,537.06 for interest and $400,139.78 for rentals) were $3,113,427.89—leaving $635,745.53; from which dividends amounting to $575,000 were paid, leaving a balance of $60,745.53. During the same years there was expended for new construction $130,791.26, for equipment $117,299.45, and for real estate $62,371.89—a total of $310,462.60.

BALANCE SHEET, JANUARY 1, 1883.

Cash	$116,470.07
Construction—Union	809,333.00
Construction—Continental	161,009.26
Equipment—Union	457,307.49
Equipment—Continental	105,476.74
Real Estate—Union	520,071.80
Real Estate—Continental	113,869.99
17th and 19th Sts. Pass. R. W. Co	200,000.00
17th and 19th Sts. Stock	600,000.00
Cable Road	146,663.31
Stock	35,072.75
Feed and Supplies	38,379.81
Accounts Receivable	11,302.13
Total	$3,314,956.35
Capital Stock—Union	$751,100.00
Capital Stock—Continental	580,000.00
Funded Debt—Union	500,000.00
Funded Debt—Continental	350 000.00
Funded Debt—17th and 19th	200,000.00
Profit and Loss	933,856.35
Total, as above	$3,314,956.35

President—WILLIAM H. KEMBLE.

Vice-President—PETER A. B. WIDENER.

Secretary and Treasurer—JOHN B. PEDDLE.

Directors—Peter A. B. Widener, James McManes, William S. Stokley, William L. Elkins, Henry Bumm, M. S. Quay.

Superintendent—JACOB C. PETTY.

Cable Cars for Brooklyn.

A COMPANY has been formed under the name of the Brooklyn Cable Railroad Company, to introduce the cable system of towing street cars in Brooklyn. It is proposed to build a line from the ferry at the foot of Montague street to the junction of that street with Court street. The corporators are Edward A. Phelps, Jr., Hiram W. Hunt, Henry E. Dodge, Henry D. Polhemus, Sanford W. Battershall, Edward Annan, C. E. Copeland, Charles Ryder, Charles Wheeler and Samuel H. Swan. The capital is fixed at $250,000, and it has all been taken up. Mr. Phelps has been made president of the company, and maps have been filed. It is intended to begin work as soon as the necessary preliminaries can be settled, and it is expected to have the road in operation by the fall. The system of towing is the same as that successfully operated in San Francisco, Chicago and Philadelphia.

The Philadelphia Cable Motor.

THE new Cable Motor of the Union Passenger Railway Company, on Columbia avenue, Philadelphia, between Thirty-third street and East Park, was formally opened on the 5th inst. The cable, which is of crucible steel, and 9,200 feet in length, was run at the rate of seven miles per hour, by the two "Porter & Allen" engines of 100 horse power each, which have been built to supply the motion. The cable passes through a tunnel or pipe beneath the track, and becomes attached to the car by the action of a "grip," which moves along a narrow, continuous opening midway between the rails. Three trains of three cars each were run several times over the road, a distance of about $1\frac{3}{4}$ miles, and the workings of the system were thoroughly tested to the satisfaction of the visitors. The cars started gradually and smoothly, and were stopped promptly, but not so suddenly as to be unpleasant to the riders. The same speed was maintained on the heavy grade of three feet to the 100 as on the level portion of the road.

Best Pavement for Horse Railroads.

BY AUG. W. WRIGHT,
SUPT. TRACK AND CONSTRUCTION, NORTH CHICAGO CITY RAILWAY.

Editor American Railroad Journal.

SIR:—Supplemental to my article in your issue of the 24th ult. is the following, explaining our method of paving tracks and detailed cost thereof. In the opinion of the writer no pavement equals that formed of selected cobble stone of suitable size and properly laid, as regards the horse railways. All who have studied the subject and written upon pavements are united in the opinion that an ideal pavement should combine the opposite requirements of a firm foothold for the animal and a smooth surface for the vehicle; most pavements are a compromise between these conflicting requirements. Either the pavement is made smooth to suit the latter, causing the most painful struggles on the part of any poor brute drawing a heavy load to maintain a foothold, or they give the foothold to the great inconvenience of the user of the vehicle by more or less painful jolts, and become a nuisance to all within hearing of the ceaseless din and noise. Our rail, affording a smooth surface of steel for cars and vehicles, paved with small selected cobble stone, giving a firm foothold for the animal, is a near approach to the ideal pavement. We estimate that the railroad life of our horses is prolonged twenty-five per cent by the substitution of such cobble stone for wood. Parties interested in this subject can find a paper in the May, 1881, number of the *American Engineer*, that I read before the Western Society of Engineers, entering at greater length into this subject of pavements. I therein quote from horse railroad managers, from the Atlantic to the Pacific, favoring this pavement, and it has been adopted as the standard pavement for this company, with the addition of rows of granite blocks adjacent to the rails, to take the wear and prevent ruts.

Any pavement is merely a surface to take the wear, and consequently great attention should be given to providing a firm foundation, without which the pavement rapidly disintegrates. Nothing better effects this purpose than the tramping of horses. Therefore, whenever possible, I have our car-horses travel over the new track filled with sand, dampened with water from hydrants in lieu of rain, should the latter not be forthcoming, until firm and solid. The surface is then removed to the proper

depth and a layer of Desplaines gravel, a natural cement, thrown in. This possesses the quality of hardening, when it adheres so firmly to the stones that they can be removed with difficulty. A row of granite blocks is then set along each rail. My specifications for the granite are: stones not less than six nor more than seven inches in depth, nor less than three nor more than four inches in width, and not less than six inches in length. They are required to be dressed square and true, so they can be laid with joints not exceeding one-half inch. The cobble stones are then set in place and are twice rammed to a firm bearing and level surface, and covered with one-half inch of Desplaines gravel to be worked into all interstices by the traffic. The cost of such pavement to this company last season was as follows for one mile of double track. The space paved in the street was sixteen feet in width, including the four lines of rails five inches each. Deducting this space occupied by rails, leaves 5,280 feet x 14 feet 4 inches = 8,408 2-9 square yards.

22 days foreman @$3.25	$71 50
116 days paver @ $3.00	348 00
31 days paver @ $2.50	77 50
131 days rammer @ $2.15	281 65
340 days labor @ $1.50	510 00
195 days team @ $5.00	975 00
624 loads cobble stone @ $6.00	3,734 00
528 loads of gravel @ $4.00	2,112 00
53,576 granite blocks @ 10½cts	5,625 48
240 stone cross-walks @ $1.60	384 00
Total	$14,119 13
Average per square yard	1 67

The granite used averaged 27 stones to the square yard, which weighed 6,425 pounds. It cost on board cars in Chicago $2.70 per square yard. Handling, weighing and hauling into our storage yard, until used, made the stones average 10½ cents each. The cobble stones cost on board vessel at our dock, $20 per cord of 13,000 pounds. The average weight of many wagon loads was 3,545 pounds. The cost of hauling, weighing and piling in our yard averaged $2 per cord. The same stone are worth to-day $30 per cord. The gravel was purchased by the cubic yard and each car load measured. It cost per average wagon load in yard $4, or $2.25 per cubic yard. An analysis of the above items shows that our pavers laid on an average 51½ square yards of pavement per diem, as the foreman, in addition to superintending the work, paved about three-quarters of the time, assumed at 16 days. The granite occupied about 2,000 square yards of the surface, leaving 6,409 square yards of cobble stone, requiring about 174 cords; or one cord laid 37 square yards. About 940 cubic yards of gravel were used, averaging 1½ inches in depth, on top of sand filling. It will be noticed that all the material used by this company is provided in advance and stored in yard before the work is begun. This adds to the cost of material, but saves the greater cost that would be incurred by loss of traffic from delays caused by the non arrival of material as needed, and most of our work consists in relaying existing lines.

The repairs on such a pavement are nominal after one year, and it possesses all the essentials, from a "horse" railroad point of view—cheapness in first cost, durability, a firm foot hold!

I use the word "horse" railroad, Mr. Editor, advisedly, for a "tramway" operated by an endless cable, or any steam, gas, compressed air, electrical or other motor, might find solid granite a better pavement.

TRAMWAY NOTES.

One of the intolerable nuisances of tramway travel in this city is the persistency with which people lug into the cars huge bundles, overflowing baskets, bags of clothes, picture frames, children's velocipedes, and an endless amount of bulky trash. They occupy the floor of the cars and the seats with their packages, which are also shoved into fellow-passengers' faces or deposited with emphasis upon their feet. This annoyance has been lately a growing evil on the elevated as well as the surface roads, especially during commission hours. If the man without a bundle has any rights, there is no justice in permitting him to be made uncomfortable by a neighbor who pays only one fare while he or she takes up the room of two people. A Boston car company has met this evil by insisting that no large parcel can be carried elsewhere than upon the front platform, nor without the payment of an extra fare. The company was driven to this arrangement by experiences which could readily be duplicated here. One man boarded a car with a barrel of flour; another had a tub of butter and a package; a market-boy carried two large baskets of meat; while people with trunks and errand-boys with huge rolls of merchandise have been daily travelers. Why should not a similar rule be enforced on our roads? Let the luggage be confined to the front platform, or else let the companies run one set of cars for passengers and another set for freight.

The Prytania Street Extension of the New Orleans City Railroad was formally opened on the 12th inst. The extension runs from the old station up Prytania to Upperline, to Pitt, to Soniat, to Boudousquie street, to the corner of Dufossat street and St. Charles avenue, where by means of a turn-table the cars are sent back over the route on the other one of the double tracks used. The distance is one and one-half miles either way, the entire work of construction having been completed in fifty and three-quarter days, under the direct supervision of Superintendent Wintz. Steel rails are used all the way, and the work was done in the best manner with the best materials, as the unusually smooth running of the initial car demonstrated. The time made in running up to the terminus on Dufossat street was thirteen minutes, including the time occupied in turning the table, and the run back to the old station occupied twelve minutes. The trip showed that the track is laid in a splendid manner, as the car ran over it with hardly a jolt or jar. The three or four curves on the line of the extension were made without the slightest difficulty. Six cars have been rebuilt for the use of the extension, making twenty-one cars in all in use on the Prytania street line. They are all provided with the Excelsior car starter, invented by D. Negrotto, of that city. The fare is five cents for the whole length of the line, from Canal to Dufossat street. Col. Jos. A. Walker is president of the company, and Fred. Wintz superintendent.

On the new cars of the Sixth avenue surface road, instead of the old bell strap dangling in the middle there is now a series of small straps running through brass clamps between the windows and within easy reach of seated passengers. When one of these straps is pulled a spring in a little box in the corner blows a whistle and the conductor pulls a rope connecting with the driver's bell. In this manner it is intended that no one shall signal the driver but the conductor, and passengers can attract the attention of the conductor without leaving their seats.

The New Orleans City Council have granted to the City Railroad Company the right of way for the extension of its Camp and Magazine street line through Laurel street, to the lower line of the City Park, in the Sixth District. The road, as thus extended, will form one continuous line from Canal street to the City Park. For this privilege the railroad company gives a bonus to the city of $50,000, the said amount divided into five yearly payments, the first of which falls due on January 1, 1890.

The stockholders of the Hall's Springs Street Railway Company have re-elected as directors H. Irvine Keyser, William Keyser, Robert Garrett, John A. Robb, J. Morrison Harris, John S. Gilman and Levi Fischmeyer. It was decided to issue to the City of Baltimore 171 additional shares of stock at $20 par per share for the indebtedness on account of park tax. The city has become the largest stockholder in this company through this plan of taking stock for park tax in default.

New car 28 of the Fourth Avenue Railroad has a framework of ash, finished with satinwood and panels of curly maple. The

spring seats and backs are of woven cane. The metal work is polished brass. Besides the end lights, a large lamp in the top at the centre illuminates the interior in a manner never before seen on the cars of this railroad by the "oldest inhabitant."

THE Market Street Passenger Railway Company, of Philadelphia, is building two new cars which will have only four windows on a side, 21½ by 39½ inches in size, and have perforated cane seats and brass interior fittings.

GROUND has been broken at Somerville, Mass., by the Charles River Railway for the extension of its new line. It is to run from Summer street to Putman avenue, and from there to the new stable on School street.

THE Long Island City Shore Railroad and Steinway Avenue Railroad, two of the principal horse-car routes in Long Island City, were purchased by William Steinway, of Steinway & Sons, on the 17th inst., for $9,000.

THE West Philadelphia Railway Company have made application to the city councils for permission to change the method of propelling their cars on the streets used by them.

THE Charles River Railway Company, Cambridge, Mass., has added seven new and handsome cars to its rolling-stock, which will be put in operation at once.

JOHN MCCARTHY has been elected president of the Citizens' Passenger Railway Co. of Philadelphia, to fill the vacancy caused by the death of George Williams.

IN the New York Assembly on the 17th inst., Mr. Oakley's bill requiring bob-tail cars to have conductors was lost by a vote of 62 to 37.

THE Maysville, Kentucky, tramway will be three miles in length, and cost $10,000 per mile.

MERIDIAN, Miss., is going to build a street tramway from the depot to Rose Hill Cemetery.

CARS commenced running on the Johnstown (Penn.) Street Railway on the 10th inst.

W. H. PALMERSTON has been appointed manager of the St. Thomas Street Railway.

THE Seventh Avenue, Brooklyn, Tramway commenced operation on the 19th inst.

GAINESVILLE, Florida, proposes to have a street tramway very soon.

THREE new combination postal, baggage and express cars were recently turned out from the Ontario Car Works, at London, Canada West. They are of somewhat unique construction, as both ends are closed up and entrance can only be gained from the large side doors. The object of this innovation is to afford protection to the express and postal officials, as it is thought that by such an arrangement it will be impossible for burglars or robbers to effect an entrance. These cars form a portion of thirteen cars of similar construction that are being manufactured there for the Canadian Pacific Railway, and four yet remain to be completed. In addition to the unique arrangement in regard to ends being closed, each compartment is provided with an apparatus that will enable the occupant of that place, in the event of fire or other necessity, to instantly apply the air-brakes and bring the whole train to a standstill.

ON the 10th of May, it is said, lunch cars will be placed on the Atlantic Coast Line, from New York to New Orleans, via Jacksonville. These cars will carry cold hams, roasted turkeys, canned goods, and wines and liquors. It is stated that the lunch set in the cars is much better in every way than the meals set in the average eating-houses. When these cars are put on, traveling will be a luxury. The fear of the ordinary railway eating-house, with its indigestible fries, slop coffee, rampant butter and leather steaks, operates as a serious drawback to travel.

Percentage of Operating Expenses.

THE annual statements of the railroads in the United States are nearly all in, and the public is put in a position to judge from facts and figures the relative value of the different railroad stocks in the country. There are many gauges of measurement in arriving at a conclusion regarding the most profitable stocks, but there is no estimate which is more reliable than that predicated on the percentage of operating expenses to gross earnings. These tell the tale and offer irrefragable proof whether the relative managements have reached the lowest possible expenditure for running their respective roads or not. The field open to discussion is one of wide and expansive area, but in the Auditor's accounts nothing shows so well as the road which exhibits a concise return for the year and displays annual earnings which, in proportion to the receipts, offer greater inducement to the capitalist to invest. The man with money is guided in his investment by the character of the management and the cost of operation in ratio to the business of the line, and in this connection it cannot be classed as an egotistical effort when local interests draw attention to the superior attractions of local roads.

After a careful and conscientious analysis of the balance sheets of the various railroads, the deduction is forced that the company which presents the lowest percentage to the business conducted is the St. Louis and San Francisco Railway, of which Capt. C. W. Rogers is the General Manager. This is one of the best managed roads in the country, and ever since its inception it has ranked as one of the most economically operated lines, which has satisfied its patrons without inclining to deterioration. It is only partially completed, and is open to enormous charges in the construction accounts for extensions and costly improvements, which enter into the general outlay and are debited to expenses which govern the proportion of operating expenses. In its last annual report evidence was furnished that its operating expenses did not exceed 44.56 per cent. It has a mileage of 695 miles under lease and control, which runs through a country mainly barren of trade facilities, and which leaves the line indebted to transient traffic for its earnings. With through business, and a consequently heavy traffic, the operating expenses would be reduced to a minimum, and a basis would be set for other corporations to emulate.

The nearest approximation is the Illinois Central, which manages 1,892 miles at a percentage of 44.91. The Missouri Pacific comes next with 51 per cent, and the Chicago and Northwestern takes its rank with 3,278 miles in 1882, operated at 53.37 per cent against 48.59 in 1880. The Chicago, Milwaukee and St. Paul estimated the cost of management last year of 4,217 miles at 60.60 against 54.70 per cent. in 1880. The Chicago, Rock Island and Pacific, with its 1,381 miles, does better, and only attains an average of 55.45 per cent, while the Louisville and Nashville, having a mileage of 2,028 and no material extensions or improvements, reports a proportion amounting to 61.97 per cent. All the roads cited are trunk lines, having a through traffic, which is an incessant source of revenue, producing business when local offerings are light and not calculated to improve the stockholders' prospects.

The secret of the management is involved in a reduction of casualties and wrecks. The St. Louis and San Francisco operates through a country which is unequaled in its engineering obstacles, offering many precipitous declines and innumerable acclivities to surmount, and on the whole giving a roadway which is liable at all seasons of the year to the perils of storms and floods. Capt. Rogers takes a just pride in his railroad, and recently in the Windsor Hotel, New York, when accosted by Eastern rivals about the low percentage of operating expenses, he replied in his suave and modest style that he was not responsible for the economy in a greater sense than that he adopted the American automatic brake when it was first submitted to the public. "I have had no wrecks or collisions, and several times

when cars were derailed on the edge of a steep bluff the action of the brake was so instantaneous that the velocity of the train was checked before the equipment was knocked into kindling."—*St. Louis Globe-Democrat.*

A Tribute of Respect to the Memory of Peter Cooper.

A MEETING of the members of the American Geographical and Statistical Society was held at Chickering Hall, this city, on the evening of the 16th inst., for the purpose of paying a tribute of respect to the memory of the late PETER COOPER. Chief Justice CHARLES P. DALY, President of the Society, in opening the proceedings, said that Mr. Cooper was one of the earliest and most valued of its members, and spoke of the numerous benefactions which it had received from his hands, and the lively interest always manifested by him in its work and progress. "It is fitting," he said, "that its members should give expression to their feelings of obligation to their departed benefactor by this memorial meeting." After eulogizing the many enobling and endearing qualities of the great philanthropist, he stated that some years after the formation of the Society there was danger of its succumbing for want of means wherewith to prosecute its several undertakings; and it would then have been disbanded but for the timely assistance rendered by Mr. Cooper, who placed rooms in the Cooper Union at its disposal free of cost until the membership was increased from 200 to 1,000 and the Society had attained a sound financial basis. He said that he had been intimately acquainted with Mr. Cooper for forty-three years, and what impressed him most during that long and familiar acquaintance was the consistent uniformity of his character. With every succeeding year of his friendship his veneration for the integrity, worth and simplicity of the man had deepened. Although he died leaving a fortune of $2,000,000, it is said that he gave away for benevolent purposes during his lifetime more than $4,000,000. Mr. Cooper had said he always recognized that the proper use for money was to do good to others, and in these words he had furnished his own best epitaph.

Judge Richard O'Gorman spoke at length of Mr. Cooper's life and works of philanthropy, describing him as a simple, unostentatious and unpretending citizen, who acquired wealth and power by the innate force of his own integrity and worth. He was a man who studied nothing but the science of doing good, and year after year, with larger purpose and larger means, he put that science to benevolent use. The career of such a man, he said, did honor to the people from whom he sprung. Peter Cooper was the model citizen of New York. He was in this republican nation a king among men—a king by the royalty of his munificence. The most fitting memorial that could be raised to him by the wealthy citizens of New York would be to take up his plans and purposes and carry them into larger and more extensive execution by building institutions like the one that he had established for the benefit of the people.

A series of resolutions was then offered and adopted in which the Society acknowledged its indebtedness to Peter Cooper for his munificence, and the great loss it sustained in his death. A resolution was also adopted to have his portrait painted and placed in the hall of the Society.

International Electric Exhibition, Vienna, 1883.

WE have been officially informed by the Austrian-Hungarian railway administration that they have concluded to grant reductions of freight on all objects sent to the Electric Exhibition in Vienna, which, according to the different tariffs on piece-goods will amount to a reduction of from 70 to 80 per cent. This much reduced tariff is relating to the transport of goods to and from Vienna. Besides, the insurance of the full value on the objects destined for the International Electric Exhibition will be allowed, and a simple certificate, issued by the Commission and added to the bill of lading, will suffice to give all these benefits to the exhibitors. With railway companies abroad, negotiations have begun which will, we have no doubt, lead to favorable results.

American Iron and Steel Trade.

THE annual report of the American Iron and Steel Association, in its review of the domestic iron trade for the year 1882, says that the extraordinary activity in the iron and steel industry, which began in 1879, culminated early in 1882, when the wants of consumers became less urgent and prices generally began to decline. Their best customers, the builders of new railroads, did not, it is true, build fewer miles of road in 1882 than in 1881, but it had become certain that much less money could be obtained for new roads in 1883 than in 1882, and the consequent shrinkage in railroad mileage in the new year had therefore to be preceded by a largely decreased demand for railroad materials and by lower prices. "Then again," says the report, "in the prosperous years referred to we had increased our capacity for the production of most forms of iron and steel much faster than the consumptive wants of the country had increased. Finally, in October, November and December came political complications which unfavorably affected all business.

"The success of the Democratic party in the Congressional elections was regarded by many as unfriendly to the continuance of our protective policy, and the report of the Tariff Commission recommending large reductions in the existing tariff served to deepen the public concern in reference to the immediate future of this policy. We regret to say that the action of Congress during the past winter in reducing duties has fully justified this anxiety, and historical accuracy requires us to add that this reduction was recommended by a Tariff Commission which was mainly composed of Republicans, and that it was accomplished by a Republican Congress. The reduction effected in the duties on iron and steel were much larger than in the duties on any other leading manufactured articles.

"Since the beginning of the present year the condition of our iron and steel industries has not improved. It seems to be absolutely certain that prices must, for some time to come, rule extremely low. This condition of affairs in the great industries under consideration may have its advantages in stimulating consumption at a time when the country is blessed with an abundance of good money, and in checking the erection of new rolling-mills, blast furnaces and steel works, which experience has shown are not needed; but it is greatly to be regretted that it brings also low wages with no compensating benefits to those who receive them. It is not true, as a certain class of political economists persistently teach, that when wages are reduced other things are correspondingly reduced in price; but, even if this were so, low wages and low prices always suggest hard times. We do not therefore regard it as a propitious sign that prices of iron and steel are now so low as they are. Good prices and good wages were far better. But the fact cannot be altered that low prices for iron and steel now prevail, and we can only hope that wages will be adjusted upon a scale that will be mutually satisfactory to manufacturers and their workmen.

"There was a large decrease in the production of iron rails in 1882 over that of 1881 and a small decrease in the production of open hearth steel rails and crucible steel ingots, but in all the other articles there was an increase in 1882 over 1881. With the single exception of pig iron, however, this increase was in no instance large, and even in pig iron it was only 11 per cent. The iron and steel imports in 1882 made a total of 1,335,371 tons, The value of our iron and steel exports was in that year $19,029,759. Our pig iron production in 1882 was obtained in twenty-six States and Utah Territory, and of the total of 5,178,122 tons, Pennsylvania produced 2,449,256 tons. The tonnage of iron vessels built in 1882 (40,097 tons) was much the largest in our history."

Promise of Great Attendance at the Coming Chicago Railway Exposition.

It has become apparent that the National Exposition of Railway Appliances, which opens May 24, in Chicago, will be very largely attended by all classes of people. Not railway men only, but mechanics, farmers, merchants and professional men all over the United States are preparing to embrace this great opportunity of observing how railways and the industrial and commercial activities of our modern life are dependent upon each other. To see what a line of railway involves, what varied industries, what wonderful inventions, what ingenious contrivances, what shrewd adaptations of the oldest principles of merchanics and quick recognition of the newest discoveries, what manifold uses of materials gathered in all parts of the world—the chance of doing this will be eagerly embraced by tens of thousands who have no personal or direct connection with railway enterprises.

The educating influence of this Exposition cannot fail to be very great. And it will be strange if it does not accomplish much toward dissipating existing predjudices and causing a more accurate understanding of those problems involving capital and labor which are now attracting so much attention. The fact that railways are tributary to all departments of labor, and that upon the industries which they have created or vastly increased depend the food upon hundreds of thousands of table and the fires of innumerable hearths, will be strongly impressed upon all who look upon the magnificent display of exhibits with intelligent observation.

National Railway Exposition Items.

Several papers, both in the East and West, have erroneously published March 24 as the opening day of the National Exposition of Railway Appliances. The right date is *May* 24, and newspapers throughout the country are requested to aid in correcting this error by calling attention to it. Already a number of persons have taken long journeys to Chicago, expecting to be present at the opening, and in several places excursions have been prematurely organized as a consequence. Everything will be in readiness on May 24 for the opening of this, the most unique, interesting and (except the Centennial) the largest exposition ever held on this continent. But to have everything in place on that day will tax the energies of the executive committee to the utmost. Some weeks since it was decided to make such additions to the Inter-State Exposition building as would increase its floor capacity by about 200,000 feet. And now the plans have been changed still further to increase this amount by 100,000 feet, making an addition of 300,000 in all. This immense extension is found to be absolutely necessary to accommodate the exhibitors who have already applied for space. The enterprise has become colossal, and it will be by far the most significant, attractive, and largely attended attraction of the coming summer.

The Association of R. R. Telegraph Superintendents has changed the date of its next annual meeting in Chicago from the first Wednesday in May to Wednesday, June 13th, so that its members may be able to visit the National Exposition of Railway Appliances, which will be in progress at that time.

One of the older railways of this country will send to the Railway Exposition a section of "T" rail which has been in continuous use from 1838 to the present year. It is intended to accompany it with statistics showing the total tonnage which has passed over it during its forty-five years of service, and also a history of its experiences during that period. The same railway will claim to enter the "oldest railroad man in the United States"—that is, the man who has seen the longest term of continuous railway service. His railway life began several years previous to that of the rail mentioned above. What stories he can tell about railroading in the early days!

The Tanite Company, of Stroudsburg, Penn., will have at the coming exhibition of railway appliances in Chicago a machine for grinding car boxes which does away with their being turned on a lathe. This machine is just completed, new in its character and of great use, as its capacity is 600 car boxes per day. They are ground perfectly true, as it is so constructed that by no possibility can a box be ground otherwise. This company also manufactures a machine for the grinding of locomotive slide bearings, of which thirty are now in use.

Lancaster Manufacturing Co.

The Lancaster Manufacturing Company has been organized under the laws of the State of New York with a capital stock of $250,000.

The facilities for manufacturing the Lancaster tools will now be very considerably increased, and every effort made to execute orders more promptly than heretofore.

The office of the company is at 95 and 97 Liberty street, New York. The officers are: James H. Lancaster president, John Pickering treasurer, John Q. Maynard secretary.

The company has acquired the right to manufacture and sell in the United States and Canada all the patented inventions of James H. Lancaster, consisting of stock, dies and adjustable pipe guides, twin pipe cutters with burr scrapers, combined pipe and nut-wrench, combined pipe cutter, wrench and burr scraper, combined punch, shear, wire cutter and anvil, pipe inside burr reamers.

Other improved tools will be added to this list from time to time, and the utmost care will be observed both in the construction of the tools and in the execution of the orders intrusted to them.

MANUFACTURING NOTES.

Riehlé Bros., proprietors of the Philadelphia Scale and Testing Machine Works, report orders coming in for their products beyond expectation. They have lately received orders for Testing Machines from the Helmbacher Forge and Iron Co., St. Louis, for a 75 ton Horizontal Testing Machine; Carnegie Bros., (Lim.) 200,000 pound Vertical Machine; Pawtucket Manufacturing Co., Pawtucket, R. I., 50,000 pound machine; and same for the Solid Steel Co., Alliance, Ohio; a 4,000 pound Cement Tester to go to Russia; and 1,000 pound Cement Tester for City Engineer's office, Toronto, Canada. Orders for scales, especially of the self-adjusting Railroad Track Scale with rocking bearings, and their celebrated Furnace Charging Scales, are numerous.

Letters from fifty-five of the leading machinery establishments throughout the country indicate the present condition of business, the progress made in 1882, and the prospects for 1883. The letters are all cheerful. There is scarcely an exception to the claim that manufacturers of machinery are everywhere in a flourishing business, and the outlook for the present year is considered promising. Most of the firms report orders for months in advance, compelling an increased equipment. The machine tool builders are apprehensive that they will be unable to fill within a reasonable time the many requisitions already on file. "Engine builders are pressed to deliver their motors, and steam pump manufacturers are enlarging their facilities to meet the increased demand."

The Bethlehem Iron Company has acquired mines, reported to be very great deposits of pure and uniform specular ore, in the Island of Cuba, at a distance of four miles from the coast, and, by a line to be run fifteen miles from Santiago, a good port. The ore is so readily accessible that it can be mined by open-cut work and can be loaded directly into the cars. Until the railroad has been built to the port in question the ore will

be transferred by lighters at the nearest point on the coast to the vessels. It is estimated that the ore can be put on board cars at the mines at a maximum cost of 50 cents per ton.

THE first iron sailing vessel built in this country was launched from the yard of the Pusey & Jones Company, Wilmington, Del., in 1854. It was the schooner christened the Mahlon Betts. In 1869 a sloop, Iron Age, was launched at the yard of the Harlan & Hollingsworth Company, of the same place. The Lillie E. Starbuck, built by John Roach and launched at Chester, Penn., on the 14th inst., is claimed by the builder to be the first full-rigged sailing ship built in this country wholly of iron.

THE American Brake Company, of St. Louis, Mo., gave an exhibition at New Haven, Conn., on the 9th inst., of its automatic engine and freight car brakes on the New Haven and Northampton Railroad in the presence of many railroad officials. The train consisted of a large engine, twenty freight cars and a passenger coach, making a total weight of 228 tons. Five experiments were made and the average stops, while running at the rate of from twenty-five to thirty miles an hour on a level grade, were made in forty seconds within a distance of 225 yards.

THE Central Pacific Railroad Company are having the Westinghouse automatic air brakes attached to the freight cars. These brakes work just opposite to the ones now attached to all passenger trains. While the engine is in motion the blocks are kept off the wheels, but when the engine is detached or the train becomes uncoupled, the brakes are immediately applied.

The Elevated Electric Railway.

BY W. L. SILVEY.

WHENEVER a new motor has been devised, about the first attempt to put it to practical use is as a locomotive. Almost before steam power had been liberated from the tea-kettle, and before it had assumed the high pressure non-condensing form, men began to speculate on its possible merits as a locomotor. So it is with every other class of motor. Spring clocks paved the way for spring motors. The expansion and contraction of metals —all solids, fluids, etc.—through heat suggested motors, and with every other class of motor locomotion suggests itself. Even the delusive perpetual motion has been assiduously worked in that direction even before it would drive itself alone. A motor invariably suggests locomotion, until it seems the subject has been thoroughly overworked. Among the class of motors most prominent and with the brightest future, none are more prominent than electro-motors. The discovery of the electro-magnet gave a powerful stimulus to scientific inquiry, and Page, Henry, Stinheil, Jacobi and others immediately turned their efforts into the new field for the purpose of producing a successful electric engine for locomotion, the electric current being supplied from a battery. Crude as were their motors, yet the success then attained reflects a bright spot on the entire field of electric efforts. Although their machines were not financially a success, yet they cast a long shadow into the history of present inventions; and although they were not able to draw a train, yet they were able to run at a considerable speed on a circular track; and considering the imperfect battery then in use, they were often machines of decided merit. We boast of the learned inventors of the present day, yet none of them has grasped the subject of electro-motors with such a firm hold or maintained such a profound supremacy for originality as did the pioneers in this grand field of scientific development. Among the numerous plans devised for turning the force of electricity to account for railway purposes, the following would evidently be most successful:

First, the employment of one rail to convey the current to the motor, the other rail to return the current to complete its full circuit.

Second, the employment of an overhanging conductor for the conveyance of the current to the machine, the rails to be used only for the return of the current—the plan for which I more fully discussed in a previous article; and

Third, cables have been tried from which the machine is suspended in such a way that the wheels of the motor may traverse their length, one of the currents flowing through each cable.

Of the three plans the second is evidently much the best, because in case of rain or snow a cross electric current would be formed between the rails which would partially if not wholly stop the flow of the current through the proper channels. As to the third plan, it is still more impractical, because the entire load being suspended from the cable it would necessitate the erection of two lines of extremely substantial columns for the support of the cables. After this has been done, then comes a more serious drawback, which results from the expansion and contraction of the cable through changes of temperature, causing it to sag between the columns so that the line would be a constant ascent and descent between each column; and in case a cable should break, owing to the distance to the ground the loss of life would be fearful.

The second plan is not open to this defect because the wheels run on a solid road-bed; and as the current flows to the motor over an overhanging conductor, the rails only conveying the current in one direction, it is next to impossible to cause a cross or short circuit, hence the loss of power is reduced to a minimum. Of all the applications to which electric motors may be adapted, none is more practicable than its employment for elevated passenger railway service, for it is here that the most power may be derived from a given current, owing to the extra insulation possible with but little expense; and the electro-motor being so much lighter than a steam motor of the same power, it is possible to employ a much less expensive roadway, which in this class of railways is an item of much importance. More than this, the electric railway presents a much more graceful appearance than the steam railway and at the same time is not nearly so cumbersome. Having made electric railways a study in connection with a peculiar electro-motor which I have recently invented and patented, the following plans have suggested themselves to my mind for its application to elevated railways. Instead of making the supporting columns of the road-bed perpendicular, as now employed on the elevated roads in New York, I would employ A shaped supports, the road-bed to be laid on the cross bar of the A shaped framework. Let the foot of the A shaped columns rest on each side of the street and the angle thus attained will give the roadway sufficient elevation to carry it entirely out of the way. The great utility of this plan is apparent, for it not only affords a safe and convenient railway, but at the same time, it being elevated directly above the center of the street, is entirely out of the way and is comparatively noiseless and cheap. Another great advantage for this plan is, the columns being A and the roadway on the cross beam, it will be seen at a glance that the columns project entirely above the car, where they are firmly secured together, and in so doing one part firmly braces the other. This renders an electric bicycle railway possible, for at the top of the A shaped columns one rail is secured, the other rail being placed on the center of the cross beam; the wheels being flanged on both sides, derailment becomes almost impossible. Under this plan the top rail carries the current, which is taken off by the flanged traveler on top of the car (which serves to keep the car upright), from which it is carried to the motor and thence to the bottom rail, along which it flows to complete its circuit. If from any cause it is deemed best to have both rails on the cross beams, then a conducting wire may occupy the top part of the A shaped framework, the current to be taken off by suitable brushes on top of the car, to be carried to the motor, and after performing its work escape through the rails. These plans will evidently solve the problem of extra insulation in electric railways, which at this time so much perplexes electrical engineers. Sufficient has been said to

open a new field, and should this lead to beneficial results I shall feel fully repaid for my efforts.

CASTLETON, Ind., April 10, 1883.

LITERARY REVIEW.

THE contents of "The Cornell University Register, 1882-83," a copy of which is sent to all graduates who furnish their addresses for the purpose, and to other persons on application to the Treasurer of the University, Ithaca, N. Y., are such as commend it to the attention of a large circle of intelligent and patriotic people. This valuable pamphlet of about 125 pages, contains among other matters an account of the organization and government of Cornell University, the terms of admission to that institution, full information as to its departments and special courses of study, its library, museum of natural history, its degrees, honors, scholarships, etc. We find under the head of "Departments and Special Courses of Study," that a laudable attention is given in the University to the pursuit of a knowledge of the mechanic arts, architecture, civil engineering, mining engineering, free hand drawing, modern languages and other subjects, which make the best of our institutions of learning not only places for the cultivation of the mind, but of real preparation for practical toil in this working-day world. Thanks to the unprecedented development of the industrial arts during this century, in a degree which the scholars of a few generations ago never dreamed of, the university has become a place from which a large proportion of the students contemplate a future of activity in the many departments of business life. Hair-splitting about words and particles, dreamy speculation and scholastic musing, have largely given place in our seats of learning to considerations of practical importance, while the old-fashioned man of books and the embryo priest still find their proper pabulum within their sacred shelter. Cornell, as everybody knows, is one of the universities most strongly imbued with the modern spirit of industrial progress. Its faculty includes the honored name of Estevan Antonio Fuertes, C. E., as professor of civil engineering. In this department instruction is given by means of lectures and recitations, with drafting and field and laboratory work. Since 1874 its faculty and students have been engaged in the surveys of the hydrographic basin of Central New York, as a contribution to the geodetic surveys of the United States Government. Its equipment is singularly complete. The student has an arduous four-years' course before receiving his degree as Bachelor of Civil Engineering. Success in another year's course leads to the degree of Civil Engineer. Want of space forbids the insertion of details regarding the department of Mechanic Arts, which is provided with the machinery and other aids desirable to a practical as well as theoretic acquaintance with the same. Cornell is one of the national colleges founded upon the land grant of 1862. Eminent men have subsequently enlarged the value of its endowment. Nineteen-twentieths of the expenses incurred in its care of more than four hundred students are paid out of the interest of permanent funds which have come from the sale of lands and from private benefactors. Tuition is entirely free to a large proportion of its students. Eighteen separate courses of study are open to the choice of the student, including, as we have seen, some of a directly practical character. The original act of incorporation provides for the admission of one student annually from each Assembly District of New York State, without payment of tuition. These "State students" are to be selected by yearly competitive examinations from the various academies and public schools of the State. We hope that enough has been said in this necessarily incomplete review of "The Cornell University Register, 1882-83," to induce at least two classes of readers to acquaint themselves with the interesting and valuable information contained in its tasteful pages; namely: (1) Those who possess the means to assist its usefulness; and (2) Those who wish to find a university for their sons providing the widest range of choice in study, with the means and the proof in the history of its achievements, that instruction given therein is thorough and adapted to the requirements of the present and prospective condition of American civilization.

AMONG the useful works lately received at this office is included the last illustrated catalogue and price-list of presses, dies, canmakers' machinery and other sheet metal tools, manufactured by the Ferracute Machine Co., of Bridgeton, N. J. This work, a large pamphlet of sixty-four pages inclosed in an elegant cover, gives descriptions of the latest developments of ingenuity in the direction indicated above, together with numerous illustrations as excellently produced as the reading matter. The last Ferracute catalogue is quite an acquisition.

OUR stock of business information has been augmented by the receipt of the descriptive catalogue of Geiser's Patent Self-Regulating Grain Separator, Cleaner and Bagger, the Landis Peerless Traction or Road Locomotive, portable and stationary engines, boilers, saw mills, etc. This is a very thorough piece of work as regards both its reading matter and illustrations, and we hope the Geizer Manufacturing Company, Waynesboro', Penn., who publish it, will have their full share of profit from its extensive distribution.

AN enterprise of a hopeful kind has its headquarters at No. 23 Park Row, this city. We refer to the publication of *The Biographer*, a monthly magazine of which the first number (that for May, 1883,) lies before us. It consists of sixty-four octavo pages in a handsome blue wrapper, and contains sketches of thirty-five eminent persons, accompanied with thirty-two portraits. Information has been brought down to date, and the portraits have been prepared on wood from recent photographs. After a careful examination of the sketches, which are necessarily short, we are able to state that we find them well written, timely, pleasing and discriminating. The first number of *The Biographer* is good and promising.

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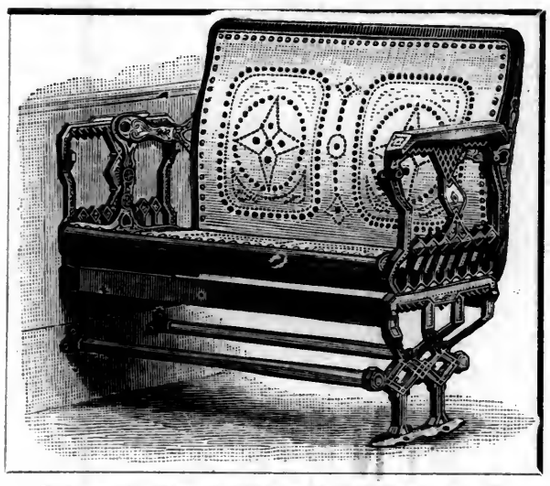
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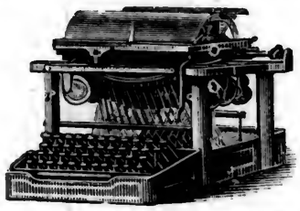
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M. M. BUCK, Railway Supplies, St. Louis.
C. W. ROGERS, Vice-President Am. Live Stock and Meat Transportation Co. etc. New York.
JOHN E. GREEN, Vice-President Louisville Railway Supply Co., Louisville.
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Adopted in the offices of the principal Railroad and Supply companies. SIMPLE, DURABLE, NEAT.

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THOUSANDS of TESTIMONIALS.

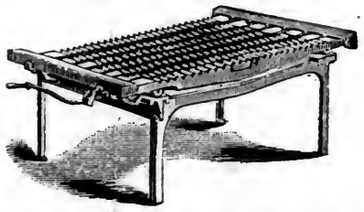
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WYCKOFF, SEAMANS & BENEDICT,

281 and 283 Broadway, N. Y.
38 East Madison street, Chicago.
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W. RYDER'S
PATENT
Practical Shaking Grate Bar,

OFFICE: 134 Water Street,
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The W. Ryder Double-Acting Grate Bars are so constructed as to rest upon a frame with friction rollers, and by means of a lever attached to the front rocking bar, a reverse or reciprocal motion is produced in each bar, which effectually breaks up the clinkers, and removes all the ashes from the bottom of the furnace.

By this means we get the largest percentage of circulation of air, which keeps the bars cool and prevents them from burning or warping. There is also fully ten per cent of fuel saved, as it does away with the necessity of opening the furnace door and shaking the fire, and thus preventing large volumes of cold air rushing in and producing sudden expansions and contractions, frequently blistering the bottom of the boiler.

This bar has two very superior qualities which no shaking grate ever possessed. The first is a large friction roller at each end of the bar, thus enabling it to be moved back and forth with the greatest ease, though the bar be ever so large and heavy. The second is the header at the end of every bar, thus absolutely protecting the bar from all obstructions of coal and clinkers, that otherwise might get at the end of the bar and stop its working. This header also affords plenty of expansion and contraction room for the bars. The first set of these bars ever made has been in constant use for some four and one-half years, without any expense except first cost, and the party using them prefers them to any other bar in use.

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[LIMITED.]



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NEW YORK.

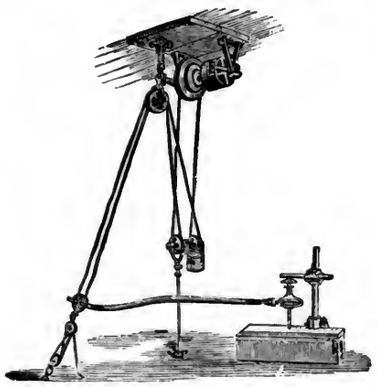
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PORTABLE Power Drill Presses,
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LIQUID RUBBER PAINT.
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SHEFFIELD VELOCIPEDE

HAND CAR.



In use on nearly every Railroad in the Country.

Runs easily; is durable, and capable of high speed, and, either as shown or when arranged for carrying two persons, constitutes the very best device for close inspection of track ever offered to the railroad public.

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Best quality and simplest plan in use.



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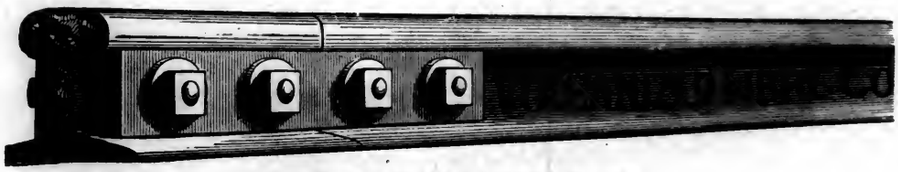
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McLEOD
Automatic Air Railroad Signal

Will prevent Railroad Accidents and Save Life.

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This signal has been fully tested on the New York and New England Railroad at Dudley and Bird Streets, by practical operation, and has proved a complete success, to the entire satisfaction of the many prominent Railroad men and experts who have watched and examined it. It provides an Automatic Block, Crossing, Station, Switch, Bridge, Yard and Curve Signal, Gate and Revolving Lanterns. Being operated by the weight of trains passing over an incline bar, forcing common air through a tube by means of a bellows, which is positive in its action, and highly commended by all railroad officials who examined it.

The company can shortly fill orders to place it on any railroad, and invite communication from Railroad Officials from all parts.

McLEOD AIR RAILROAD SIGNAL CO.,

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The 12-inch log at bottom of this picture was sawed off by two men by hand in 7 seconds before Commissioners of every country and the Emperor of Brazil.

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I have obtained decree, with costs and damages, against all parties who imitate my **M** teeth which cut with the outside of the **M** only. The two points of each tooth are set upon one side and the next two points on the other side, equivalent to front cut of ordinary hand-saw tooth, both ways, one point alternate decreases cutting one-half, as do all imitations (which are still held liable by the United States Court), and new Company will now collect of dealers and users, as well as manufacturers, for infringements. An Illustrated Catalogue furnished free on application.

For One Dollar, a Pruning Saw, complete, with brass edge sheath, or a Buck Saw blade, will be mailed. Agents wanted, to whom special terms will be made, and who can do well. This Company also manufactures the **Noon-Day Stove Polish,** so rapidly coming into favor.

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Are used to call attention to the fact that this is an advertisement of the **CHICAGO, MILWAUKEE & ST. PAUL RAILWAY.**

Its **EIGHT** Trunk Lines traverse the best portions of **Northern Illinois, Wisconsin, Minnesota, Dakota** and **Iowa.**

Located directly on its lines are the cities of **CHICAGO, Milwaukee, La Crosse, Winona, St. Paul, Minneapolis, Madison, Prairie du Chien, Mason City, Sioux City, Yankton, Albert Lea, Aberdeen, Dubuque, Rock Island, Cedar Rapids,** and **Council Bluffs,** as well as innumerable other principal business centers and favorite resorts; and passengers going West, North, South or East are able to use the **CHICAGO, MILWAUKEE & ST. PAUL RAILWAY** to the best advantage.

Ticket offices everywhere are supplied with Maps and Time Tables which detail the merits of the line; and agents stand ready to furnish information, and sell tickets at cheapest rates over the **Chicago, Milwaukee & St. Paul Railway.**

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J. T. CLARK, General Sup't. GEO. H. HEAFFORD, Ass't Gen. Pass. Agt.

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THE ONLY LINE RUNNING

THROUGH CARS

Between New York, Great Barrington, Stockbridge, Lenox, and Pittsfield—the far-famed resorts of the

Berkshire Hills

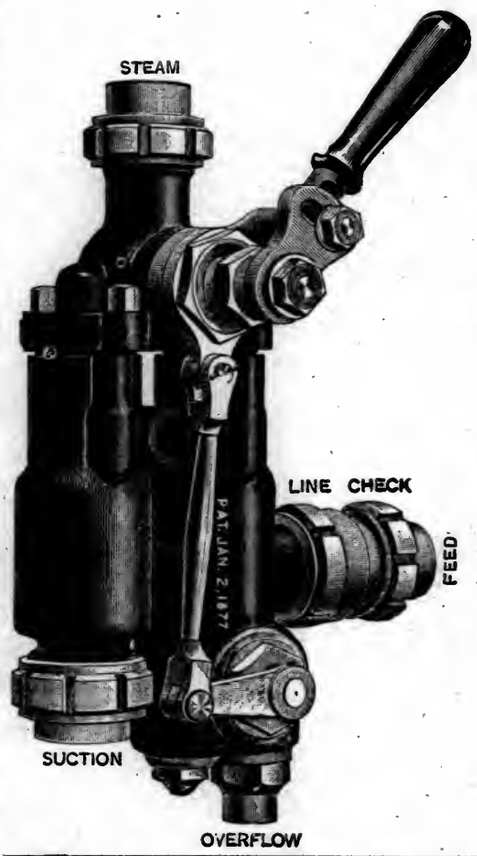
of Western Massachusetts—the *"Switzerland* of America."

Two through trains daily between New York City and all points on the Housatonic Railroad, from the Grand Central Depot via the New York, New Haven, and Hartford Railroad at 8:09 A. M. and 3:39 P. M.

Descriptive Guide-Book sent free by mail upon application to the General Ticket Agent.

H. D. AVERILL, *Gen'l Ticket Agent.*
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HANCOCK INSPIRATOR

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COMPANY,

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Transfer Steamer Maryland Route.

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PHILADELPHIA, BALTIMORE AND WASHINGTON,

WITHOUT CHANGE; connecting with through trains to **Florida** and all points **South** and **West.** Train leaves Boston at 6:30 P. M. daily.

Leave Boston for **Grand Central Depot, New York,** at 9 A. M.; returning, leave New York at 11 A. M. and 11:34 P. M., week days. Pullman Palace Cars run through.

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—BETWEEN—

BOSTON AND NEW YORK.

Steamboat train leaves Boston 6:30 P. M., arrives at New London at 10:00 P. M., connecting with the new steamer **City of Worcester,** Mondays, Wednesdays and Fridays, and **City of New York** Tuesdays, Thursdays and Saturdays. Returning, steamer leaves Pier 40, North River, New York, at 4:30 P. M., connecting at New London with train leaving at 4:05 A. M., arriving in Boston at 7:55 A. M. Good night's rest on the boat.

Ask for Tickets via N. Y. & N. E. R. R.

Office 322 Washington street, Depot foot Summer street, Boston.

S. M. FELTON, JR., Gen'l Manager. A. C. KENDALL, Gen'l Pass. Agent.

"PROGRESSIVE AND RELIABLE."

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"Under its present management

THE ERIE RAILWAY

is become the most progressive and reliable Trunk Line in America."—*Cleveland Leader.*

THE ERIE

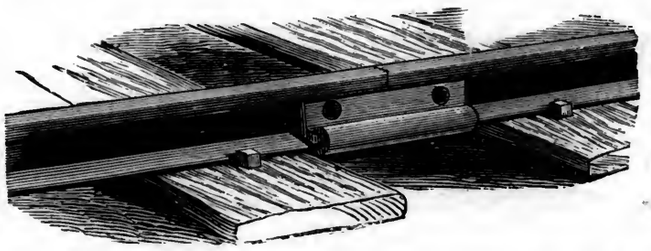
is the **SAFE and COMFORTABLE Line** between the East and West. Its equipment is unsurpassed—**Pullman Coaches, Westinghouse Air-Brake, Miller Safety Platform, Cars Lighted by Gas, Steel Rails, Double Track.**

☞ The scenery along the line includes such great Works of Nature as **Niagara Falls, Watkin's Glen, Portage Falls** and **Gorge,** the **Great Lakes** and the **Lakes** of **Central** and **Western New York,** making it truly the "LANDSCAPE ROUTE OF AMERICA."

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This is a Suspension Joint, cheap, easily applied, allows for contraction and expansion, prevents the Rail from creeping, battering or brooming at the ends, giving the rail the same strength and elasticity at the Joint as at any other part of the Rail.

The Bolts will not elongate or become loose.

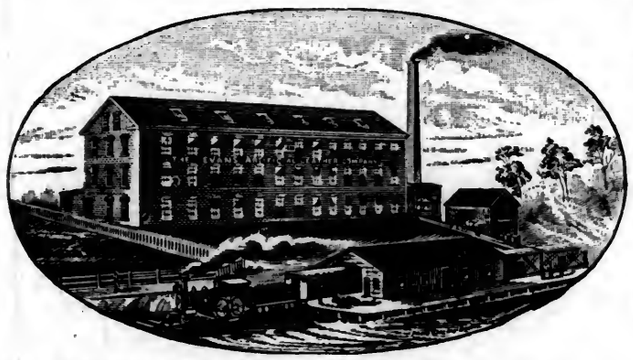
Orders and Correspondence solicited.

17 MILK STREET, BOSTON, MASS.

NEW YORK OFFICE: 243 Broadway. G. W. CLARK, Agent.

HAVE YOU TRIED THE

EVANS ARTIFICIAL LEATHER?



IF NOT, HERE ARE SOME GOOD REASONS WHY YOU SHOULD USE IT.

It is a perfect substitute for Leather in nature and appearance.
It is the only substitute that has proved practical and satisfactory.
It is unaffected by HEAT or COLD, and is impervious to OIL or WATER.
It is made in light and heavy weights, so that it can be substituted for cheap as well as costly leather.

IT COSTS LESS,

Varying from one-third to two-thirds, according to the kind of leather for which it is substituted.

WHERE EVERY ITEM COUNTS,

It is manifestly to the advantage of the Carriage Builder and Upholsterer to use a material that cheapens the cost of production while taking nothing from the looks and style of the job.

SAMPLES SENT, and information freely given by addressing the

Evans Artificial Leather Co.

WALTER N. DOLE, General Agent. **92 PEARL STREET. BOSTON. MASS.**

THE SALMON CAR HEATER



"36 per cent of coal saved and the car kept noticeably warmer!" by using THE SALMON CAR HEATER.

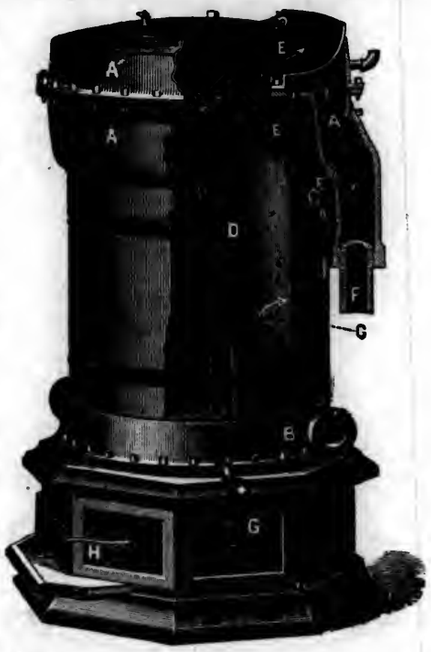
It Insures Safety from Fire in case of Accident,

Economy in Fuel and RAPID CIRCULATION. It heats quickly, is SELF-REGULATING,

and can be used for either STEAM OR HOT WATER.

The Water Tubes do not come in contact with the Coals, but occupy the Smoke Flue in such a manner as to absorb the greatest amount of heat from Coal in a **low State of combustion** without danger of chilling the fire.

At the last "Mechanics' Fair" it received the Silver Medal, being the highest award to heaters of any kind.



CORRESPONDENCE SOLICITED.

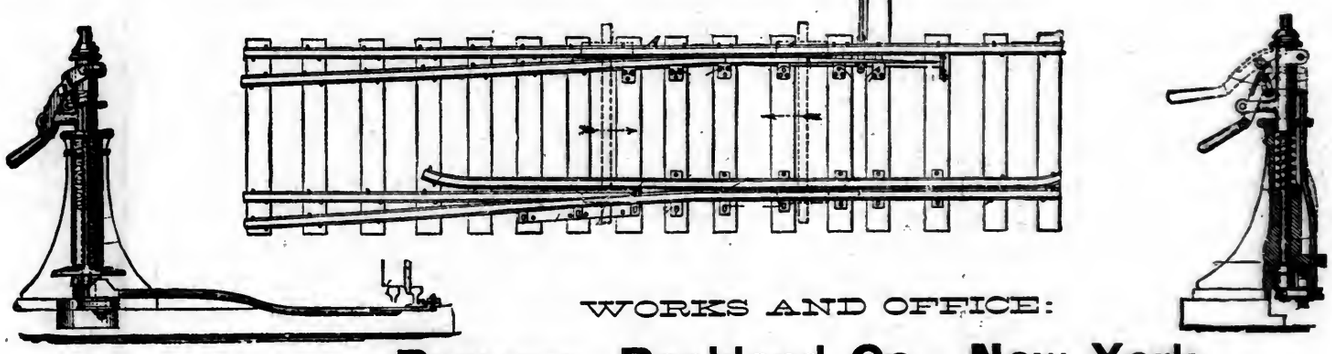
The Salmon Car Heater Company,

OFFICE: 48 CONGRESS STREET, BOSTON, MASS.

THE RAMAPO IRON WORKS,

MANUFACTURERS OF

The Tracy Safety Switch, Safety Switch Stands and Stub Switch Stands; Keyed, Riveted, and Bolted Frogs of all Weights and Patterns. A specialty of an Elastic Yoked Stiff Frog and Spring Frog of the Tracy Pattern; Reversible and Interchangeable Double and Single Rail Crossings of any desired Pattern; Car, Bridge, and Turn Tables, Heavy and Light Castings and **General Railroad Equipment.**



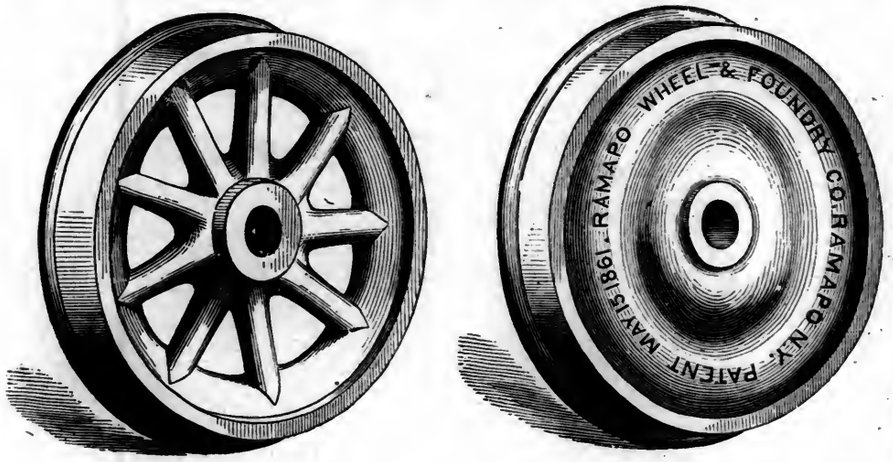
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RAMAPO WHEEL AND FOUNDRY COMPANY.



MANUFACTURERS OF

WHEELS FOR DRAWING-ROOM AND SLEEPING COACHES, TENDERS, LOCOMOTIVES, PASSENGER AND FREIGHT CARS.

W. W. SNOW, Superintendent.

RAMAPO, Rockland Co., N. Y.

Axles Furnished and Wheels Fitted.

CONGDON'S

IMPROVED CAR BRAKE SHOE.



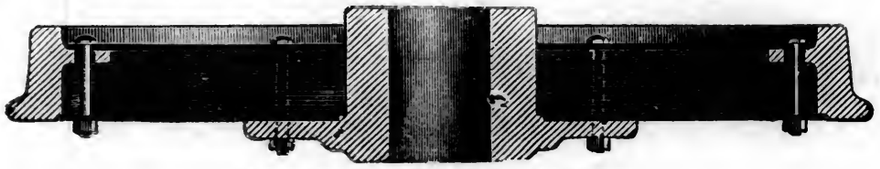
This improvement consists of a shoe having embedded in its body of cast iron, pieces of wrought iron, steel, malleable iron, or other suitable metal, which increase surprisingly its resistance to wear. All communications should be addressed to

THE CONGDON BRAKE SHOE CO., 142 Dearborn Street, or opposite Tribune Building, Chicago.

RAMAPO WHEEL AND FOUNDRY CO., Ramapo, N. Y.

ALLEN PAPER CAR WHEEL CO.,

GENERAL OFFICES: 240 Broadway, New York.



Manufacturers of Allen's Patent

PAPER CAR WHEELS,

(ALL SIZES).

Especially adapted for Sleeping and Drawing Room Cars, Locomotive and Tender Trucks, Steel Tire, with annular web—strongest, most durable and economical wheel in use. Works at Hudson, N. Y.; and at Pullman (near Chicago) and Morris, Ill.

A. C. DARWIN, Pres. **C. H. ANTES, Sec'y.** **J. C. BEACH, Treas.**



BAUGHMAN'S

PATENT

STORM PROOF RAILWAY SIGNALS

—FOR—

Stations, Crossings, Drawbridges, Switches, Cabooses and Rear-of-Train, Etc.

Manufactured by

BAUCHMAN & MARKEY,

ALBION, INDIANA.

PHOTO-ELECTROTYPE ENGRAVING

SUPERIOR, CHEAPER SUBSTITUTE FOR WOOD ENGRAVING

20 CLIFF ST. NEW YORK

SWIFT'S IRON AND STEEL WORKS.

No. 26 West Third Street, . . Cincinnati, Ohio.

Manufacturers of all Weights of Standard and Narrow Gauge Rails by the most approved process. Also Rail Fastenings, Steel and Bloom Boiler Plate, and Tank, Sheet and Bar Iron.

RAILROAD



TRACK SCALES.

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TESTING MACHINES

PHILADELPHIA: 50 South Fourth Street.

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PARDEE CAR WORKS,

WATSONTOWN, PA.



PARDEE, SNYDER & Co., LIMITED,

Proprietors.

Manufacturers of Mail, Baggage, Box, Gondola, Flat, Gravel, Ore, Coal, Mine, and Hand Cars; Kelley's Patent Turn-Tables, and Centers for Wooden Turn-Tables; Car Castings, Railroad Forgings, Rolling-Mill Castings, Bridge Bolts, Castings.

We have, in connection with our Car Works, a Foundry and Machine-Shop, and are prepared to do a general Machine Business.

Chairman: ARIO PARDEE.

Treasurer and General Manager: H. F. SNYDER. *Secretary:* N. LEISER.

New York City Office—Room 2, No. 161 Broadway.

C. W. Leavitt, Agent.



WHITALL, TATUM & CO.

NEW YORK. PHILADELPHIA.

MANUFACTURERS OF

CHEMICAL

AND OTHER

GLASSWARE.

Catalogues sent upon Application.

BROWN BROTHERS & CO.,

59 Wall Street, N. Y.

—BUY AND SELL—

BILLS OF EXCHANGE

—ON—

GREAT BRITAIN, IRELAND, FRANCE, GERMANY, BELGIUM, AND HOLLAND.

Issue Commercial and Travelers' Credit in Sterling,

AVAILABLE IN ANY PART OF THE WORLD, AND IN *FRANCS* IN MARTINIQUE AND GUADALOUPE.

Make TELEGRAPHIC TRANSFERS OF MONEY between this and other countries, through London and Paris.

Make Collection of Drafts drawn abroad on all points in the United States and Canada, and of drafts drawn in the United States on Foreign Countries.

AMERICAN Railroad Journal

·ESTABLISHED·1831·

Steam Navigation, Commerce and Finance, Tramways, New Inventions, Machinery, Mining.

WHOLE No. 2,450.] NEW YORK, MAY, 1883. [VOLUME LVII.—No. 2.

CONSTRUCTION.

THE London (Ca.) *Free Press* says that the railway link which is to connect Gravenhurst and Callendar is to be kept independent. This is a very important section, since it will give to a number of the railways the means of connecting with the Canadian Pacific at its eastern terminus. If any one company was allowed to control it all other companies would be placed at a serious disadvantage.

AT the monthly meeting of the directors of the Baltimore and Ohio Railroad Co., on the 9th inst., the president stated that arrangements had been made for the rapid prosecution of the line between Baltimore and Philadelphia, with the design of opening it at the earliest practicable period, and it was expected that contracts for all the heavy work would be offered in a brief time.

THE total length of the Great American and European Short Line Railway is about 764 miles, of which there are now completed (but owned by different parties) 308 miles, while 109 miles are under construction. The termini of the line are Montreal and Louisburg, Cape Breton. Application has been made to Parliament for a subsidy of $1,200,000 in aid of the project.

THE extension of the St. Louis and Cairo Railroad from East Carondelet to East St. Louis, a distance of five miles, will be completed during the month of May, when they will arrange to use the Relay depot in common with other roads entering East St. Louis, after which they propose making arrangements to reach the Union depot at St. Louis.

WORK is progressing on the two branches of the Southern Division of the Illinois Central Railroad, which the company is building in Mississippi. The Canton, Aberdeen and Nashville branch is now graded to Aberdeen and a large force is employed. On the Yazoo and Mississippi Valley branch track laying has been begun.

FIFTEEN hundred men are now working on the various sections of the Pittsburgh, Youghiogheny and McKeesport Railroad, and the construction is being pushed rapidly. The officials intend having the line open for business in the early part of July.

THE Warren and Farnsworth Valley Railroad will be extended during the summer to Balltown and Sherffs, where it will connect with a branch of the Pittsburgh, Bradford and Buffalo Railroad. It will open up for business the new Balltown oil territory.

IT is expected that through trains will be run by the Rochester and Pittsburgh Railroad Company from Rochester to Pittsburgh by the 15th inst. via the Low Grade division of the Allegheny Valley Railroad, with which they connect at Falls Creek.

THE track of the Northern Pacific Railroad is expected to reach Helena from the east and Missoula from the west by July 1, leaving a gap of only 130 miles to be ironed. Before September the line will stretch unbroken from Lake Superior to the Pacific.

THE branch of the Southern Pacific Railroad has been completed from Mohave, Cal., to the Colorado River on the Arizona border, a distance of 252 miles, and in a few days the Atlantic and Pacific Railroad will meet it there from the east.

THE track has been laid on the Clifton and Southern Pacific Railroad from Lordsburg, N. M., north ten miles. Grading is completed for thirty-five miles more, and there is material enough on hand to run the road for fifty miles.

THE Cincinnati and Eastern Railroad will be completed to Galena, Scioto County, Ohio, by the 15th of May, and to Portsmouth by the 1st of August. Contracts have been made for all the bridges and the steel rails to be used on the road.

CONSIDERABLE interest is felt in the proposed Kingfield and Portland (Me.) Railroad. The preference seems to be to connect it with the Sandy River Railroad at Fairbanks. The road will be two feet gauge like the Sandy River.

THE President has accepted another fifty mile section of the Northern Pacific Railroad in Montana. This section, which was recently completed, extends from the 550th to the 600th mile of the road west of the Missouri River.

THE Atlantic and Pacific Railroad, which extends from a junction with the Atchison, Topeka and Santa Fe Railroad near Albuquerque, N. M., through Arizona to Mojave is expected to be completed by the 1st of June.

THE Chattarol Railroad is now completed to Richardson, Ky., on the west fork of the Big Sandy, five miles southward from the old terminus at Peach Orchard, and forty-eight miles from the northern terminus at Ashland.

THE Pennsylvania Company propose this season to double their tracks between Crestline, Ohio, and Chicago, and add some twenty miles of double track west to the Pittsburgh, Cincinnati and St. Louis Railway.

THE Shamokin, Sunbury and Lewisburg Railroad, which is to connect the Reading system with that of the New York Central, will be put in operation May 15. It will be thirty-one miles long and cost $1,900,000.

THE Greeley, Salt Lake and Pacific Railroad, which is owned by the Union Pacific Railway Company, has been extended this year 6.7 miles to Pennsylvania Gulch, which is 14.2 miles west of Boulder, Col.

THE track has been laid on the Kansas City and Southern Railroad from Clinton, Mo., south four miles to Jordan's Springs. Grading is in progress between Jordan's Springs and Browningston, five miles.

THE Central Pacific Railroad Company is pushing forward its branch line through Northern California to Oregon to compete for the trades of that region with the Northern Pacific.

THERE is a prospect that the St. Joseph Valley Railroad, which is now completed from Berrien Springs, Mich., to Buchanan, will be extended to St. Joseph this summer.

THE Illinois Central Railroad Company is raising the road-bed of the Springfield Division, laying it with steel rails and arranging it to connect with the new St. Louis route.

ENGINEERS are now engaged in surveying a line to some point on the Gulf coast for the extension of the Thomasville, Tallahassee and Gulf Railroad.

THE Wheeling and Lake Erie Railroad will be completed from Marietta Junction to Bowerston, a distance of about eighteen miles, the coming summer.

THE Southern Pacific Railroad Company has begun the construction of a branch line from Aptos to Loma Prieta to tap the valuable red wood forests.

IT is expected that trains will be running over the Ontario and Quebec Railroad from Sharbot Lake to Perth by the end of July.

THE Oregon Short Line Railroad has been completed to Hayley, 279 miles, leaving 200 miles of road yet to be built.

THE extension of the Kentucky Central Railroad will be completed to Richmond by the 1st of July.

INCORPORATION.

THE Atlantic Highlands and New York Railroad Company has been organized under the General Railroad Law of New Jersey, with a capital of $100,000, divided into 1,000 shares of $100 each. The incorporators are John S. Applegate and Joseph A. Throckmorton, of Red Bank; Rev. John C. Nobles, Rev. James E. Lake and Somers T. Champion, of Atlantic Highlands, and Richard A. Leonard and Thos. H. Leonard, of Leonardville. John S. Applegate has been elected president; Thomas H. Leonard, treasurer, and Edward Bowne, secretary. The company will at once build a road from Atlantic Highlands to Hopping's Station, on the New Jersey Southern Railway, thus making through connections to New York and Philadelphia. The estimated cost of the road, which will be three miles in length, is $40,000. Next fall it will be extended from Hopping's Station to Middletown, where it will connect with the New York and Long Branch Railroad.

ARTICLES of incorportion were filed with the Secretary of State of Minnesota on the 3d inst. of the Minneapolis, St. Paul and Seacoast Railway Company, with a capital of $15,000,000. The incorporators are Alexander Ramsey, W. W. Kettson, H. H. Sibley, of St. Paul; Richard Chute, A. B. Nettleton, Judson N. Cross, of Minneapolis; E. H. Thayer, Q. S. Stacy, of Iowa; Ralph Haumb, Scranton, Ill., and J. D. Harvey, of Chicago. The road runs from Minneapolis, by way of St. Paul, striking the southern boundary of the State in Fillmore County and the Mississippi River at Canton, Iowa. The following are the officers: Alexander Ramsey, president; A. H. Thayer, vice-president and general manager; H. H. Sibley, treasurer; J. N. Cross, secretary and general solicitor.

ARTICLES of incorporation have been filed in the office of the Secretary of State of Indiana of the Atlantic and Mississippi Railroad Company. The capital stock is fixed at $200,000. The directors are: John Higgins, John M. Boyd, Peter A. Huffman, Richard Neptune, John C. Farber, George M. Wilds and Samuel Harding. It is proposed that the road shall run from the Ohio State line at the southeast corner of Union township in Adams County to the most eligible point on the Illinois line within three miles of the southwest corner of Eugene township in Vermillion County, passing through the counties of Adams, Wells, Huntington, Grant, Howard, Tipton, Clinton, Boone via Thornton, Montgomery, Fountain and Vermillion. The line is to be 150 miles in length.

ORGANIZATION.

THE stockholders of the Freehold and Jamesburg Agricultural, the Pemberton and Seashore, and the Philadelphia and Long Branch railroad companies held their annual meetings in Camden, N. J., on the 1st inst., and elected directors as follows: Freehold and Jamesburg Agricultural: Strickland Kneass, president; H. Allaire, B. S. Buckalew, Alexander M. Fox, James R. McClure, A. R. Oviatt, Lewis Perrine, Jacob B. Rue, Clifford S. Sims, Edmund Smith, and Henry D. Welsh. Pemberton and Seashore: Strickland Kneass, president; George M. Dorrance, W. L. Elkins, Edmund Smith, Alexander M. Fox, B. S. Buckalew, H. H. Houston, Wistar Morris, N. P. Shortridge, Henry M. Phillips, Henry D. Welsh, N. P. Wetherill, and E. T. Green. Philadelphia and Long Branch: George M. Dorrance, president; Alfred L. Dennis, Warren E. Dennis, F. Wolcott Jackson, C. R. Thurston, Robert E. Pettit, W. J. Sewell, B. S. Buckalew, Geo. R. Roberts, Alexander M. Fox, Edmund Smith, Strickland Kneass, and Henry D. Welsh.

AT a meeting of the directors of the New York Central and Hudson River Railroad Company, the Lake Shore and Michigan Southern Railway Company, and the Michigan Central Railroad Company, held in this city on the 4th inst., the following officers were elected: New York Central and Hudson River Railroad Company—Chairman of the board of directors, Cornelius Vanderbilt; president, James H. Rutter; first vice-president, Charles C. Clarke; second vice-president, Chauncey M. Depew; third vice-president, J. H. Hayden; assistant to the president, J. Tillinghast; treasurer, R. V. W. Rossiter; comptroller, Isaac P. Chambers; secretary, E. D. Worcester. Lake Shore and Michigan Southern Railway Company—Chairman of the board of directors, William K. Vanderbilt; president, John Newell; vice-president, secretary and treasurer, E. D. Worcester. Michigan Central Railroad Company—Chairman of the board of directors, Cornelius Vanderbilt; president, H. B. Ledyard; vice-president, E. D. Worcester; treasurer, Henry Pratt.

AT the annual meeting of the stockholders of the New York, Susquehanna and Western Railroad Company, held in Jersey City on the 3d inst., the following directors were elected for the year ending May 1, 1884: Frederic A. Potts, Simon Borg, Charles Minzesheimer, William S. Dunn, S. V. White, R. S. Chapel, R. K. Dow, John L. Farwell, Henry Marks, Garrett A. Hobart, John I. Blair, Charles Seidler, and Henry P. Talmage. Frederic A. Potts was chosen president, W. S. Dunn vice-president, C. V. Ware treasurer, and John P. Rafferty secretary.

THE officers of the Rapid Transit Railway Company, of Staten Island, elected on the 28th ult., are: Adolph L. King president, Frederick White vice-president, J. F. Emmons treasurer, Theodore E. Leeds secretary. Charles E. Quincy, Alfred E. Boardman and Henry Cowan, the latter of Glasgow, Scotland, were elected directors, after the resignations of Erastus Wiman and W. W. MacFarlane were accepted. Mr. Wiman resigned to become president of the Staten Island Railroad Co.

AT the annual meeting of the stockholders of the Chicago, Burlington and Quincy Railroad Company, held in Chicago, Ill., on the 25th ult., the following directors were unanimously re-elected: John M. Forbes, Sidney Bartlett, Chas. J. Paine, John L. Gardner, Jr., Wm. Endicott, Jr., and Edward Bangs, of Boston; T. Jefferson Coolidge, of Manchester, Mass.; John N. A. Griswold and Peter Geddes, New York; Wirt Dexter, of Chicago and C. E. Perkins, of Burlington, Iowa.

THE directors of the Louisiana and Missouri River Railroad Company, elected on the 3d inst., are: R. P. Tansy, St. Louis;

William H. Mitchell, John Craven, and George Strout, Chicago; John J. Mitchell, St. Louis; H. V. P. Block, Pike County, and Col. Williams, of Howard County. The directors subsequently elected R. P. Tansy president, William H. Mitchell vice-president, Charles H. Foster, Chicago, secretary and treasurer, and F. A. Wann assistant secretary.

At a meeting of the stockholders of the Delaware and Hudson Canal Company, held in this city on the 8th inst., the following gentlemen were elected managers for the ensuing year: A. A. Low, J. M. Halstead, L. B. Cannon, J. R. Taylor, Thomas Dickson, J. J. Astor, R. S. Hone, James Roosevelt, A. R. Van Nest, H. J. Jewett, David Dows, R. M. Olyphant, and Thomas Cornell. At a subsequent meeting of the managers Thomas Dickson was unanimously re-elected president, Robert M. Olyphant vice-president, Coe F. Young general manager, James C. Hartt treasurer, F. M. Olyphant secretary.

At the annual meeting of the Burlington and Lamoille Railroad Company, held at Burlington, Vt., on the 30th ult., the following board of directors was elected: F. M. Van Sicklen, D. C. Linsley, George L. Linsley, Cyrus M. Spaulding, Morillo Noyes, and Lawrence Barnes of Burlington, Waldo Hingham of Hyde Park, George W. Hendee of Morrisville, Henry Smile of Cambridge, L. B. Howe of Jericho, Josiah Tuttle of Essex and L. F. Terrill of Underhill.

The election of officers of the Iron and Metal Exchange, held on the 1st inst., resulted as follows: Edward P. White, president; M. B. Flynn, vice-president; T. Delafield, treasurer; Carl Mayer, John T. Williams, Allston Gerry, J. H. Whitney, D. Houston, William Hagan, E. A. Caswell, J. G. Sibbard, H. B. Moore, William P. Tilton, George V. Tompkins and A. G. A. Harnickell, managers. This is the final act in the consolidation of the Exchanges.

At the recent annual meeting of the Northern and Northwestern Railroad Company, held in Hamilton, Canada, the following gentlemen were elected directors for the ensuing year, namely: John Stewart, John Proctor, W. Hendrie, Edward Gurney, Samuel Barker, M. Leggat, Ald. Sir Thomas Dakin, London, Eng.; Charles Bischoff, London, Eng.; James W. Barclay, M. P., Forfarshire, Scotland.

At the annual meeting of the Lake Shore and Michigan Southern Railway Company, held at Cleveland, Ohio, on the 2d inst., the following directors were elected for the ensuing year: William H. Vanderbilt, Cornelius Vanderbilt, William K. Vanderbilt, Augustus Schell, Samuel F. Barger, John E. Burrill, Darius O. Mills, Edwin D. Worcester, John Newell, William L. Scott, Charles M. Reed, Rasselas Brown, J. H. Wade.

At the annual meeting of the Central Ohio Railroad Company, held at Columbus, Ohio, on the 25th ult., the following gentlemen were elected directors: Orland Smith, J. H. Collins, Isaac W. Hall, Bradford Dunham, Joshua G. Harvey, Robert Garrett, David Lee, Joseph R. Swan, W. B. Brooks, Daniel Applegate, Joseph W. Jenkins, William H. Clements and Osmund Latrobe.

At the annual election for directors of the Central Railroad Company of New Jersey, held on the 11th inst., the following gentlemen were chosen: Henry S. Little, John Kean, Franklin R. Gowen, Edward C. Knight, Robert Garrett, Sidney Shepard, Theodore F. Randolph, Samuel Sloan and J. Kennedy Tod.

The second annual meeting of the United States Car Co., in which Boston parties are largely interested, was held in Concord, N. H., on the 8th inst., when the following directors were re-elected: Matthew Van Wormer, Simeon Brownell, Frank Brownell, Emery M. Mayo, F. D. Adams, Lloyd W. Pennell, Alden P. Jacques, Henry Baldwin, Edward C. Bryant.

At the annual meeting of the stockholders of the Eastern (N. H.) Railroad Company, held at Portsmouth on the 1st inst., the following board of directors was elected: Moody Currier, Dexter Richards, Francis Thompson, Edward L. Giddings, Edward A. Abbott, William H. Goodwin. Moody Currier was chosen president, and William Hackett clerk.

At the annual meeting of the stockholders of the Wilmington and Northern Railroad Company, held at Reading, Penn., on the 7th inst., the following directors were re-elected: Henry A. Dupont, of Wilmington; George Brooke, of Birdsboro; Charles Huston, of Coatesville; A. L. Foster, of Wilmington; Richard Ely, of New Hope; Charles Wheeler and John Gerhard, of Philadelphia. H. A. Dupont was elected president, P. S. Ermold, of Reading, secretary and treasurer, and J. H. Thompson, of Coatesville, general superintendent.

At the annual meeting of the stockholders of the Indiana, Bloomington and Western Railway Company, held on the 8th inst., the following directors were elected: J. Rogers Marshall, John L. Farrell, George E. Leighton, F. W. Peck, Charles Stanford, Robert K. Dow, Henry W. Marshall, Joseph Dow, J. R. C. Sherwood, F. W. Dunton, Alfred Tully, Austin Corbin, James B. Edmunds.

At a meeting of the stockholders of the Western Car Company, held in the Drexel Building, this city, on the 1st inst., the following gentlemen were elected directors for the ensuing year: P. Perkins, Charles T. Win, Joseph W. Drexel, E. L. Hinman, and James L. DeVou. The officers are: President, T. Lovejoy; vice-president, Anthony J. Thomas; treasurer, J. P. Curtis.

The officers of the New York Petroleum Exchange, elected on the 8th inst., are: President, L. H. Smith; first vice-president, W. H. Johnson; second vice-president, D. R. Offley; treasurer, Henry M. Curtis; secretary, William Fisher. The Exchange was reported to be in a prosperous condition. Its membership now numbers 432. The surplus in the treasury amounts to $25,000.

At a meeting of the stockholders of the Manchester and North Weare Railroad Company, held at Manchester, N. H., on the 7th inst., Jesse Gault, Charles F. Balch, Benjamin A. Kimball, Charles Chase, J. Thomas Vose, E. C. Shirley and William J. Hoyt were chosen directors. The directors organized with Jesse Gault as president and Nathan P. Hunt clerk.

At the annual meeting of the Michigan Central Railroad Company, held at Detroit, Mich., on the 3d inst., the following directors were elected: Wm. H. Vanderbilt, Cornelius Vanderbilt, Augustus Schell, Samuel F. Barger, Wm. K. Vanderbilt, Edwin D. Worcester, Anson Stager, Wm. L. Scott and Henry B. Ledyard.

At the annual meeting of stockholders of the Franconia Iron Company, held at Concord, N. H., on the 2d inst., the following directors were chosen: L. D. Stevens, T. H. Ford, Sylvester Marsh, Edward Spalding, C. H. Amsden, E. S. Nutter, Charles Williams, C. H. Greenleaf, B. F. Caldwell, J. A. Stover.

The directors of the Burlington and Lamoille Railroad Company organized on the 1st inst., by the choice of the following officers: D. C. Linsley, president; Cyrus M. Spaulding, vice-president; E. W. Peck, clerk and treasurer; George L. Linsley, general manager.

The directors of the Rhode Island Locomotive Works have elected the following officers for the ensuing year: President, Charles Felix Mason; vice-president, Earl Philip Mason; treasurer, Wm. P. Chapin; secretary, Arthur Livingston; agent, Wm. H. Fenner, Jr.

The stockholders of the Nantasket Beach Railroad Company held their annual meeting in Boston on the 3d inst., and elected the following board of directors: J. B. Moors, J. L. Curtis, George R. Eager, A. W. Moors, George L. Keyes.

The directors of the Sunbury and Lewistown Railroad Company, elected on the 7th inst., are: Aaron Fries, James H. Campbell, Josiah Hart, Samuel G. Lewis, John W. Moffly, Geo. Shannon, and Stephen Greene.

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WE invite railroad officers to send us notice of elections, transfers, appointments, resignations, etc.; and all our readers would oblige us by furnishing us with any items of news which may come to their knowledge and are of a suitable nature for our columns. It is our intention to publish monthly full and accurate information regarding those enterprises and industries to which the AMERICAN RAILROAD JOURNAL is devoted, and to effect this end we solicit the co-operation of readers interested therein. We aim specially to record all new railway enterprises in the United States and Canada, and to note the progress of construction on all new roads and extensions; and we request those concerned in railway building to give us early information concerning the above, that our reports may be as complete as possible.

NEW YORK, MAY, 1883.

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OUR last number presented an improvement in the makeup and appearance of this paper, and explained the change from its being a weekly to a monthly publication. In the present issue we report that the office of the publishers is now at No. 245 Broadway, New York, than which no site more eligible can be found. Within a few feet of the post-office, and in the immediate neighborhood of all the leading newspapers of the metropolis, the present location of the publishers and editors of the AMERICAN RAILROAD JOURNAL is all that is desirable in convenience and accessibility to the sources of information.

THE WITHDRAWAL OF RAILROAD OFFICIALS.

WILLIAM H. VANDERBILT has seized upon the occasion of the annual election for officers to retire from the presidency of the New York Central and Hudson River Railroad Company, the Lake Shore and Michigan Southern Railway Company, and the Michigan Central Railroad Company; and his son CORNELIUS VANDERBILT was chosen as Chairman of the Board of Directors, with JAMES H. RUTTER as President, of the New York Central and Hudson River; WILLIAM K. VANDERBILT (who is also President of the New York, Chicago and St. Louis Railway) as Chairman of the Board of Directors of the Lake Shore and Michigan Southern, with JOHN NEWELL as President; and CORNELIUS VANDERBILT as Chairman of the Board of Directors of the Michigan Central, with H. B. LEDYARD as President.

The elder Mr. VANDERBILT succeeded to his prominent position as comptroller of the Vanderbilt system of roads upon the death of his father, some years ago; although he had been a prominent officer and concerned in the management for more than twenty years. He is not borne down with weight of years; but common rumor states that he is suffering from an incurable infirmity which requires that he shall abstain from active business pursuits. His mental faculties are believed to be as good as at any previous time; and his retirement is an entirely voluntary act—mainly, it would seem, dictated by the requirements of his bodily health.

Mr. VANDERBILT's father gained the distinction of having acquired within his lifetime the largest fortune ever accumulated on this continent by peaceful methods. There was a time when the late A. T. STEWART would have been accounted a wealthier man than the senior VANDERBILT; but before the death of the railroad magnate, partly by the great rise in value of railroad property, and partly by injudicious landed investments by the merchant, there can be no doubt that Mr. VANDERBILT must have passed him in the race of accumulation. His son has simply maintained and perpetuated the pre-eminence won by his father. It is no common distinction, in a country where wealth is contended for so strenuously, and where it constitutes by far the most attractive prize for ambition, and stands as a measure of success, for any one to have inherited a fortune of fifty millions, which, in the course of ten years' time, he has doubled into a hundred millions. A hundred millions, chiefly of personal property, is a fortune so colossal as to have few parallels in any country, and in none where it is the result of but little more than one person's achievements. His sons, grandsons of the Commodore, are now to step into the distinctions and responsibilities of office. During their earlier years much has been pre-

dicted for them by admiring friends; and it now remains to be seen whether the third generation will have the wisdom, self-denial and courage to hold on to the accumulations of the first and second. They rest under a disability in the fact of having had rich men for father and grandfather; but, as in the case of the Astor family, this is not conclusively against them.

A few weeks ago common report stated that JAY GOULD was building a yacht in which to make a cruise around the world; and that he was, at the same time, to abandon active Wall street business in favor of his son. Mr. GOULD's career has been even more phenomenal than that of either of the Vanderbilts, and reads to all the world more like a story from the Arabian Nights Entertainments, than the plain prose of current history. Mr. GOULD's accumulations rank second only to those of Mr. VANDERBILT; his fortune being rated in the neighborhood of fifty millions of dollars; but this stupendous sum has been gained almost wholly since the beginning of the war, or a little more than twenty years. He is still a young man, under fifty. So far as can be discovered from external evidences, his health, strength and mental vigor, though never conspicuous, are as good as ever. He is by far the largest stockholder in the Western Union Telegraph Company, and the Wabash, St. Louis and Pacific, and the Missouri Pacific railway companies, with their dependencies and affiliations; besides being a large stock and bond holder in the New York, Lackawanna and Western Railway Company. He is conceded to be the most brilliant, nimble and enduring speculator that has ever appeared in the whirlpool of Wall street operation. In spite of the predictions of his downfall, based upon the experiences of his predecessors in the same field—Messrs. TOBIN, LOCKWOOD and DREW—he shows no sign of succumbing; but, on the contrary, acquires more and more power; and so long as he retains his faculties and his capital, he can continue to add to his enormous possessions. It is not unreasonable to suppose that he may yet surpass the Vanderbilt fortunes should he aspire to do so.

Rumor credits HUGH J. JEWETT, another of the Trunk Line managers, with a disposition to retire on account of failing health. The pressure and strain of railroad management wear out, inevitably, the strongest man.

The late THOMAS A. SCOTT, it is well known, hastened his death by devoting his extraordinary energies to the business of the Pennsylvania Railroad Company. His labor was incessant, and his recreation *nil*. The result was an untimely decay of powers, and a premature grave. His was perhaps an extreme, but not an uncommon, instance of the drain every day made upon the energies of a railroad president. The growing demand for strength is out of all proportion to the innate power of the human faculties. The president of a Trunk Line and branches, in these days, requires the comprehensive grasp of mind of a statesman, with the attention to details of the general of an army. Few of them can stand the strain; only those of a remarkable physical and mental organization can endure it for an extended period. Such is the competition of business that it becomes a veritable race for life—a contest in which the shrewdest minds and toughest bodies win. The revenues to be collected and expended exceed those of some kingdoms and empires. The number of men employed exceeds those of many great armies. These have to be kept at work and, in many instances, fed, clothed and sheltered. The requirements of motive power are more exacting and complicated than the commissariat and ordnance for an army, while the necessary efforts to preserve the peace, and to patch up and prevent the constant drift into ruinous war, are akin to the efforts of statesmen and counsellors in their diplomacy—to say nothing of their collisions with legislative bodies.

The railroad system of the country shows an inherent tendency to gather itself into great groups which may be called systems—after the analogy of the human circulation—and all the so-called independent lines find it for their advantage, and sometimes necessary for their preservation, sooner or later, to ally themselves with one or other of the great systems near them. Some of these systems reach as high as 6,500 miles of railroad, while several of them run between 2,500 and 5,000. To keep 5,000 miles of railroad in operation requires about 1,000 locomotives, 25,000 cars, and a working force of 25,000 men, with an expenditure of from $10,000,000 to $15,000,000 per annum for labor and current supplies, exclusive of the large amounts required for construction and improvements. This vast system of industry has grown up within fifty years—the greater part of it within twenty-five years—so that much of it has been placed in the control of young men whose apprenticeship could not have been extended. "Young men for action, old ones for counsel," says the proverb. The older and sager officers naturally climb to the top positions. By the time a man becomes president or vice-president of a great railroad company he must have spent many years in arduous labor, and is nearly worn out.

Take the generals of an army: they are the survivors of many struggles. The College of Cardinals is careful to select an aged member of their body for the popedom, partly on the ground that old men are likely to be conservative and keep things about as they find them, and partly because the probability of an early demise gives every one of the electors a better chance for the succession. Very different is the course of procedure in regard to the railroad presidencies. As a rule, favoritism can do but little. The fittest only survive, the weaker vessels go to destruction. Let no man envy the lot of a railroad president; for he is doomed to a life of incessant toil. Unlike the generals of an army, the kings and the national presidents, his name is seldom handed down to posterity upon the pages of history; nevertheless, many of them exhibit by their achievements a talent and a genius which should entitle them to more than military renown and honorable mention. In exchanging them for the feudal barons and principalities of three centuries ago, civilization has made a great advance. The same men who are now so conspicuous in the walks of trade, commerce and transportation would, if the genius of their times had called for it, have been equally conspicuous in the terrible arts of despotism, war and destruction.

PASSENGER TARIFF.

WHILE much is being written on freight tariff, but little, if anything, is written or said on the question of passenger tariff. When railroads cannot agree as to the rates for freight, they can appeal to a railroad commission and all come into line for a uni-

form rate. When the rates are too high, merchants can combine; and such is their power when they form a combination that the railroads are forced to accede to their demands. But, regarding a passenger tariff, a combination of passengers is rarely formed. When the fare from a terminus to a given place is too high, the passenger, instead of uttering a protest, quietly gives up his home and moves to another locality where he does not have this difficulty to contend with. In regard to the convenience of the time on which a train is run, passengers are more outspoken, and do not hesitate to circulate petitions for signatures, which, when ready, are sent to the proper officials, and, in many cases, the petitioners gain their point.

Now the question of a passenger tariff is, in some respects, a more difficult problem than that of a freight tariff. It is made still more difficult from New York City to the small places circling the city, from the fact that rents are so high in the metropolis that the railroad officials know that a certain proportion of men doing business here must live elsewhere. New York provides the best homes in the world for the very rich and the very poor, but comparatively *no* homes for the great middle class. Hence it is argued that this middle class—too proud to live with the poor, and too poor to live with the rich—will seek homes in some suburban town, where they can be placed on an equality. Such ought to be the case, but the facts prove the contrary. In New York City are thousands of families living from hand to mouth, that ought to live in these suburban towns. Many reasons are urged why they do not, such as malaria, mosquitoes and the attractions of a city life.

Now, as there is malaria and as there are mosquitoes in New York city, and as there can be attractions in every suburban town, the true reason must be found outside of those reasons above given, and *is* found in the passenger tariff and the system of running local trains.

Take the New York, Lake Erie and Western Railroad as an illustration. This road issues three classes of tickets for its passengers to these suburban towns. We will take Passaic as the representative town, because a number of the railroad officials live there, the present Mayor of Passaic being the treasurer of the Erie.

Now, from New York to Passaic the road has what it calls a local tariff, an excursion tariff and a commutation tariff. The local tariff is forty cents, or over three cents a mile; the excursion tariff is fifty-five cents, or over two cents a mile; the commutation tariff, if made in one payment, is sixty-two dollars a year, plus seven per cent interest, or sixty-six and 44-100 dollars. If a commuter travel every day, Sundays and holidays included, he is carried for about eighteen cents a day or a little less than one cent per mile. This would not be so great a hardship (though the rate is too high) were it not that the commuter is obliged to pay the sixty-two dollars in *one* payment. When a man is unable to make this payment at one time, the road makes a scale of payments for him, beginning with eight dollars for the first month and ending with three and 85-100 dollars for the twelfth month. If the commuter buy his twelve monthly tickets consecutively, he rides over the road almost as cheaply as though he made the payment in one sum for the year. But, in order to accomplish this end, he must buy for twelve *consecutive* months. If, after paying eight dollars for the first month, $7.15 for the second month and $6.25 for the third month, he is called away on business for a month, he is obliged to commence all over again by paying eight dollars for his next ticket. If the man, when at home, travels every day, Sundays and holidays included, it will cost him about twenty-four cents a day. But very few commuters travel *every* day. A large proportion of them do not travel on Sundays and holidays, and are absent from home more or less at other times. The average commuter does not travel over the road more than two hundred and fifty days out of the three hundred and sixty-five, hence the cost to him amounts to over twenty-six cents a day. This is altogether too high. A man doing business in New York and living in Passaic should be carried back and forth at an expense of not more than eight cents each way.

There is another annoyance to which commuters are subjected, and against which they ought loudly to protest, and that is the present style of ticket, which has to be punched by the conductor on each trip and renewed every month. Some system like the old fashioned system of the season ticket, good for three months, ought to be introduced, such ticket to be good for any number of rides for the period specified. Then, if a commuter lost several days by absence from home, he would not feel his loss, because he could go to the city in the evening without paying extra fare, and this would be a compensation.

It seems to this JOURNAL that the time has come when the railroads must pay more attention to local traffic than they have done. This attention must exhibit itself in a tariff that, added to house rent will make it cheaper for a man to live in a suburban town than in the city. It must be shown in the issuing of a ticket that will enable a commuter to ride over the road as many times as business or inclination prompts. It may have to go still further and give a man who builds a house costing twenty-five hundred dollars a free pass for two years,,and a man who builds a house costing four thousand dollars or more a pass for three years. The railroad that first institutes a liberal policy in this respect will be the most favored and prospered regarding its local traffic.

THE OPENING OF THE NATIONAL RAILWAY EXPOSITION.

IT is needless to remind our readers, after all that has been published in these columns for several months past, that the great National Railway Exposition will be opened at Chicago on the 24th inst. Nor is it necessary to recount the various attractions which are offered, and which are well calculated to draw together not only from all parts of our own country but also from abroad, a vast assemblage; for these, too, have been printed by us from time to time as they came to our notice. It will be gratifying, however, to those who contemplate being present to learn that ample provision has been and is being made for their entertainment as well as enjoyment, and that a register of hotels, boarding houses, etc., with rates of charges, etc., will be kept at a convenient place for the inspection of visitors. It may not, however, be amiss here, even though it should prove to be a repetition of what had been previously mentioned, to state that among the exhibits will be the little

locomotive "Rocket," built in England more than fifty years ago. This will be placed alongside of the ponderous and most perfect machines of the leading builders of the present day, among which will be the largest locomotive ever built, weighing over seventy tons, and fitly called the "Mastodon." At the same time there will be exhibited one of the earliest built passenger cars, which has recently been undergoing repairs by its builders, in contrast with the superb drawing room, dining and sleeping cars of the most accomplished workmen of the year in which we live. There will also be an electric railway constantly running; and most of the electrical and other signal systems will be shown in operation every day. It would be impossible to reherse here all the attractive features of the Exposition. People should go to it and see for themselves. There is no limit to the means of reaching Chicago from all points cheaply and expeditiously, and we opine that there will be scarcely any limit to the people who will avail themselves of the opportunity thus offered for recreation, instruction and profit.

In Ceylon it was only a short time ago that a practical line of railway from the lowlands to the interior was laid down. For about fifty miles the bed is almost level, but in the next twelve miles of road, where the country is very mountainous, the gradient is a constant of one in forty, with frequent sharp curves of small radius besides. To take an ordinary train over this latter portion of the road two locomotives are required in the ascent, and a full and liberal application of the brakes in the descent. The tear and wear in the working of this line are consequently enormous, and it would seem that a great saving would be at once attained if the light American instead of the heavy English railway system were adopted.

The Secretary of the Interior at Washington has rendered a decision in which he approves the map of definite location of the Northern Pacific Railroad through the Rocky Mountain Division, filed July 6, 1882. The line so approved departs from the line of general route at Galatin City, and unites with it again at the Little Blackfoot. One effect of the change between these two points is to shorten the line about forty-three miles. It will also have the effect to release from the land grant and restore to the public domain more than a million acres of land.

The American Savings Bank was organized in this city on the 7th inst., by the election of A. B. Hepburn, late Superintendent of the Bank Department as president, William L. Strong as first vice-president, Frederick Billings as second vice-president, William Irvin as secretary. The Savings Bank building is at No. 501 Fifth avenue, corner of Forty-second street, and will open for business on the 21st inst.

Henry R. Worthington, having removed on the 1st inst. from 239 Broadway to his new offices and warerooms 86 & 88 Liberty street and 145 Broadway, New York, now has increased facilities for meeting the demand for his smaller classes of pumps, as well as improved accommodations for his Water Works business.

The Lake Superior and Northwest Railroad Company was organized at Duluth, Minn., on the 7th inst., with a capital stock of $5,000,000. The road will run from Duluth to Red River, at the mouth of Red Lake River, and will have various branches.

The Molecular District Telegraph and Telephone Company was incorporated in this city on the 5th inst. The proposed route of the line includes New York, Albany, Boston, Long Island and through New Jersey to Philadelphia.

PERSONAL.

The President has appointed Isaac Brandt of Iowa, Wm. Dean of Minnesota, and John Kelly of Oregon, a commission to examine twenty-five miles of the Northern Pacific Railroad on the Missoula division of that road, in Montana Territory. He has also appointed Albert Ordway of Washington, G. Pomeroy Keese of New York, and Aaron H. Cragin of New York, a commission to examine another section of the same road on the Rocky Mountain division, in Montana Territory.

J. E. Childs has been appointed assistant general superintendent of the New York, West Shore and Buffalo Railway, with his office at 15 Broad street, New York. He will have charge of arranging the operating department, appointing the various officers, agents, etc., subject to the approval of the general manager; he will direct the movement of general traffic upon the road as it is opened for business, and will perform such other business as may be assigned to him.

The Directors of the Pennsylvania Railway Company have appointed John Thomas general superintendent of the eastern and western divisions of the Pittsburgh, Ft. Wayne and Chicago Railway, the Lawrence Railroad, the New Castle and Beaver Valley, the Erie and Pittsburgh, the Ashtabula and Pittsburgh, and the Northwestern Ohio railroads. His appointment takes effect May 15.

General Rosser, late chief engineer on the Canadian Pacific Railway, has been appointed engineer of the city of Winnipeg. He will still retain his position as chief engineer of the Winnipeg and Hudson Bay Railway, on which the engineering operations have already commenced.

H. B. McClellan has been made general eastern passenger agent and Charles G. Eddy general eastern freight agent of the Missouri Pacific and the Wabash, St. Louis and Pacific railways, with offices at No. 243 Broadway, N. Y.

L. W. Stevenson, late general agent of the Mexican National Railway at Monterey, has been appointed acting general freight and passenger agent of the same company with headquarters at Laredo, Texas.

R. C. Vilas has been appointed freight traffic manager of the New York, Lake Erie and Western Railroad Company and its leased lines, and Edward Foley the general freight agent of the company.

L. L. Lincoln, who has been superintendent for several years of the Bucksport and Bangor Railroad, has accepted the position of superintendent of the Buckfield and Rumford Falls Railroad.

Henry F. Douglas has been appointed chief engineer of the new line to be constructed by the Baltimore and Ohio Railroad Company between Baltimore and Philadelphia.

Francis C. Draine has been appointed general manager of the Staten Island Railway company. Holton Wood has been made treasurer, and J. J. Stephens auditor and secretary.

James L. Negley has been elected vice-president, and James L. Negley, Jr., secretary and treasurer of the Pittsburgh, Allegheny and Chicago Railroad Company.

Andrew J. Cromwell, assistant master of machinery of the Baltimore and Ohio Railroad, has been made acting master of machinery in the place of N. C. Chapman, resigned.

Barney Ball, of Syracuse, has been appointed general freight manager of the New York, West Shore and Buffalo Railroad Company.

Charles Daniel has been appointed master mechanic of the Memphis division of the Chesapeake, Ohio and Southwestern Railroad.

L. S. Coffin, of Fort Dodge, Iowa, has been appointed Railroad Commissioner of that State to succeed James Wilson, elected to Congress.

E. T. Logee has been elected superintendent of the Milford, Franklin and Providence Railroad, with headquarters at Milford.

New York Surface Steam Railways.

THE Railways of the State are naturally divided into three distinct classes, viz: the Surface Steam Railways, the Elevated Steam Railways and the Surface Street Railways—the last two are treated of in another portion of this month's issue. Of the former it should be borne in mind that many of them either pass through or terminate in other States; and therefore the ratio of mileage in this State, as compared with the total miles operated by such corporations, has necessarily been resorted to as the only means of obtaining even an approximation to other important results, which are applicable only to the railway system properly pertaining to the State of New York. Of this class there are 324 corporations which, being organized under the laws of the State, are required to make annual reports to the State Engineer and Surveyor, in the form, and within the time prescribed by law, and for the fiscal year ending September 30, in each year. Of this number only 260 have made such reports for the year ending September 30, 1882.

Of the roads reporting there were in operation 7,369.45 miles, and of branches 2,689.02 miles, a total of 10,058.47 miles (of which there were 6,641.63 miles in this State.) To which add 2,616.61 miles of additional track, and 3,056.75 miles of sidings—making the total miles of track in operation 15,731.83 (of which 10,447.50 miles are in this State). There were also 628 miles of road completed, but not in operation, on the 30th September last, and therefore not computed in the above mileage, including the New York, Chicago and St. Louis; and a considerable portion of the New York, West Shore and Buffalo, which has since been in rapid progress, with every prospect of its completion during the present year.

Upon the roads in operation there were in use at the close of the year 3,541 locomotive engines, being an average of one for each 2.84 miles of road. Of these, 883 were for passenger service, 1,752 for freight service, 631 for switching, and 71 for mixed service, while 204 were leased but not owned. The car equipment consisted of: 2,297 first-class passenger (an average of one for each 4.38 miles of road), 552 second-class and emigrant (an average of one for each 18.22 miles of road), 876 baggage, mail and express (an average of one for each 11.48 miles of road), 140,240 freight of all kinds, of which 25,746 are leased, (an average of 13.94 for each mile of road).

The number of miles run by passenger trains was 27,715,904. Passengers transported: through, 8,226,427; do. way, 48,758,047; do. not designated, 9,707,088—total, 66,601,562, equal to 1,677,388,206 transported one mile. Average miles traveled by each passenger, 25.15. Average amount received per passenger per mile, 2.02 cents; average cost of transportation per passenger per mile, 1.40 cent.

The number of miles run by freight trains was 50,323,001. Tons of freight transported: products of the forest, 5,195,325; products of animals, 2,501,313; products of agriculture, 10,932,284; products of manufacture, 6,677,157; products of merchandise, 7,170,273; products of other articles, 38,695,164—total, 71,171,516, equal to 8,852,782,515 tons transported one mile. Average miles each ton was carried, 124.38; average amount received per ton per mile 0.8168 cent; average cost of transportation per ton per mile, 0.6166 cent.

The receipts during the year were: from passengers, $33,872,943.85; from freight, $72,310,074.95; from mails, $2,276,965.46; from rents, $2,064,568.18; from other sources, $8,242,386.81—total, $118,766,939.25 (of which $78,421,989.33 is the proportion for this State).

The expenditures during the same time were: for cost of transportation, $77,999,405.98; for interest, $17,171,338.09; for dividends, $16,290,927.37; for rentals of leased lines, $4,089,798.93; for miscellaneous items, $1,911,122.84—total, $117,462,593.21, (of which $73,233,357.09 is the proportion for this State).

The total cost of roads in operation was $702,868,948.18 (proportion for this State, $464,105,946.46); total cost of equipment, $95,522,313.28, (proportion for this State, $63,073,727.01); in addition to which there had been expended on roads not in operation, $106,980,670.58.

The total capital stock issued amounted to $623,772,211.67, (proportion for this State, $397,386,453.21); total funded debt $447,531,783.47, (proportion for this State, $285,108,996.17); total unfunded debt, $33,747,405.09, (proportion for this State, $21,501,330.56—total capital stock and indebtedness, $1,105,051,400.23, (proportion for this State, $703,996,779.94).

Percentage of net earnings on capital stock and debt, 4.096; do. on cost of road and equipment, 5.106. Percentage of passenger expenses to passenger earnings, 69.01; do freight expenses to freight earnings, 75.48; do. total expenses to gross earnings, 65.67. Average cost per mile: for maintaining road and real estate, $1,893.50; for repairs of machinery and cars, $1,366.83; for operating road, $4,495.22; for transportation expenses, $7,755.55. Average number of persons employed during the year, 80,258; average for each mile of road, 8.

Semi-Centennial of the Philadelphia and Reading Railroad Co.

APRIL 4, 1883, was the fiftieth anniversary of the incorporation of the Philadelphia and Reading Railroad Company. The incorporators of 1833, who were then known as "Commissioners," were Thomas Biddle, Edward R. Biddle, John White, Robert A. Parrish, and James Wood, of Philadelphia; Jonathan Roberts and Reece Thomas, of Montgomery county; Matthias Pennypacker, Emmor Kimber, Samuel Shaffer and William Rogers, of Chester county; G. DeB. Keim, M. S. Richards, Isaac Heister and James Everhart, of Berks county; Samuel Harvey and Jedediah Strong, of Germantown; Joseph Solms, Eliah Dallett, Jacob Frick, Joseph B. Mitchell, James McCormack, James Boon, William G. Alexander, Erskine Hazard, Joshua Lippincott and William A. Marvin. The act has been supplemented frequently during the past fifty years, and it is a curious fact that the supplemental acts were nearly if not quite all passed in the month of April.

A COMPARATIVE test between the Salmon Heater in a combination car, and a Baker & Smith Heater in a passenger car running on the same train proved the Salmon Heater to possess the power of heating up the circuit of pipes in one-fourth the time required by the Baker & Smith; the car was kept warmer with less radiating pipe, and a saving of 100 pounds of coal in six days; the circumstances in the test being manifestly in favor of the Baker & Smith, a combination car being harder to heat.

AT the general Railroad Time Convention in St. Louis, Mo., on the 13th ult., a resolution on standard time was adopted providing that roads east and adjacent to Washington shall run by the 75th meridian or Eastern time. Between these points and Kansas City they shall run by the 90th meridian or central time, or one hour slower than Eastern time; west of Kansas City by the 105th and 125th meridian or Western time, two and three hours slower respectively than Eastern time.

AMONG subjects to be reported by committees at the annual convention of the Master Car-builders' Association to be held in Chicago, beginning June 12, 1883, are "Refrigerator Cars," "The Causes of Accidents to Train and Yard Men," and "Sharp Wheel Flanges."

THE next annual meeting of the Master Car Builders' Association will be held in the Grand Pacific Hotel at Chicago, Ill., June 12, 1883.

GREAT is the force of habit, and great are the excellence, variety and popularity of the Esterbrook Steel Pens.

RAILROAD EARNINGS.—MONTHLY.

B., C. Rap. & N.:	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1881	167,750	124,510	148,551	184,680	165,630	205,912	174,351	209,112	221,801	221,748	202,180	232,812	2,259,037
1882	252,823	225,631	224,107	178,304	199,278	211,257	198,276	224,921	261,439	300,155	278,439	246,062	2,800,679
1883	197,402	187,001	252,913	218,253	.....	.....	.....	.....	.....	.....	.....	.....	.....
Central Pacific:													
1881	1,602,907	1,454,218	1,709,638	1,872,370	2,091,411	2,159,382	1,899,346	2,088,519	2,185,303	2,507,857	2,297,971	2,225,179	24,094,101
1882	1,839,469	1,720,675	1,969,737	2,054,687	2,342,298	2,229,105	2,076,648	2,350,557	2,495,445	2,424,529	2,139,299	2,020,349	25,662,757
1883	1,718,000	1,424,000	2,021,000	2,035,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chesapeake and Ohio:													
1881	162,540	184,389	228,479	227,343	252,235	241,135	225,096	262,858	247,144	236,396	230,022	203,562	2,702,762
1882	208,746	179,053	215,445	267,454	255,939	260,753	306,831	371,175	332,219	347,882	287,850	.....	.....
1883	244,142	250,287	270,676	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago and Alton:													
1881	487,890	461,641	529,915	558,190	548,556	635,860	676,205	769,751	774,790	771,844	672,380	646,812	7,557,741
1882	585,830	517,897	588,700	564,861	559,577	617,250	702,635	856,398	912,692	858,674	749,915	701,066	8,215,495
1883	637,804	538,537	671,576	584,981	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago and Northwestern:													
1881	1,240,664	963,204	1,178,795	1,474,612	1,879,006	2,306,440	1,983,032	2,315,164	2,292,676	2,341,098	2,019,038	1,855,477	21,849,209
1882	1 644,935	1,474,176	1,672,931	1,668,741	2,110,947	2,022,700	2,025,736	2,099,755	2,497,053	2,532,100	2,069,287	1,718,379	23,828,973
1883	1,382,704	1,264,907	2,059,700	1,742,900	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, Burlington and Quincy:													
1881	1,307,948	1,034,821	1,418,149	1,574,371	1,679,455	2,083,803	1,888,358	2,173,945	2,262,981	2,031,001	1,816,133	1,905,490	21,176,455
1882	1 658,834	1,457,300	1,566,217	1,530,838	1,505,261	1,437,164	1,625,006	2,086,858	2,186,400	2,270,444	2,199,421	2,027,060	22,550,804
1883	1,625,680	1,611,021	2,396,583	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, Milwaukee and St. Paul:													
1881	990,847	682,717	916,989	1,259,946	1,538,491	1,729,811	1,568,706	1,678,361	1,644,67c	1,591,052	1,569.597	1,854 269	17,025,462
1882	1,434,536	1,376,376	1,561,386	1,517,567	1,629,000	1,620,000	1,465,000	1,545,000	1,950,000	2,251,000	2,072,000	1,964,000	20,386,726
1883	1,359,000	1,258,000	2,044,000	1,972,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, St. Paul, Minneapolis and Omaha:													
1881	257,786	158,594	251,648	261,211	350,124	404,562	383,202	385,586	373,370	379,029	592,921	432,615	3,981,296
1882	327,498	333,200	413,200	377,288	406,420	363,109	331,480	394,555	482,997	546,671	317,595	375,796	4,973,052
1883	302,700	277,900	415,800	419,535	.....	.....	.....	.....	.....	.....	.....	.....	.....
Denver and Rio Grande:													
1881	307,476	317,681	398,493	433,111	514,767	584,230	548,284	606,193	589,287	638,432	547,055	626,728	5,980,488
1882	488,599	407,000	521,500	556,917	614,298	537,462	495,797	574,040	595,306	630,598	512,965	443,000	6,349,857
1883	418,300	433,400	521,600	573,700	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hannibal and St. Joseph:													
1881	154,401	122,874	176,356	190,812	172,950	190,740	201,893	210,240	215,103	231,913	195,607	194,336	2,230,961
1882	125.601	152,691	185,368	158,113	151,999	147,526	184,609	254,569	239,732	238,563	249 252	239,891	2,303,388
1883	179,591	180,887	228,410	193,481	.....	.....	.....	.....	.....	.....	.....	.....	.....
Illinois Central:													
1881	631,281	524,499	557,789	662,493	673,259	803,887	720,004	868,407	828,847	815,238	737 218	763,475	8,586,397
1882	1,019,453	987,998	995,474	887,543	674,749	663,746	752,251	813,600	828,238	865,325	752,144	697,051	8,831,281
1883	1,058,620	931,971	1,106,658	888,431	.....	.....	.....	.....	.....	.....	.....	.....	.....
Indiana, Bloomington and Western:													
1881	90,283	83,261	192,085	203,677	200,064	199,846	199,125	272,114	247,332	225,678	200,450	192,622	2,487,569
1882	195,824	175,755	204,538	205,934	182,554	186,133	206,072	278,814	273,100	269,046	256,998	205,212	2,641,675
1883	248,142	202,931	268,801	215,912	.....	.....	.....	.....	.....	.....	.....	.....	.....
Louisville and Nashville:													
1881	812,118	805,124	947,959	855,704	828,726	1,227,885	817,135	876,192	951,566	1,002,950	1,065,223	1,153,779	11,344,361
1882	964,527	960,315	1,068,834	953,603	958,130	1,215,490	1,063,765	1,043,912	1,114,513	1,215,932	1,192,390	1,221,509	12,981,432
1883	1,118.735	1,015,000	1,141,337	941,129	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mobile and Ohio:													
1881	224,347	216,768	230,916	163,551	145,803	136,517	135,546	160,789	210,262	256,924	262,986	258,212	2,403,224
1882	159,676	158,590	148,166	141,937	134,378	135,184	135,174	137,475	157,874	267,433	295,110	307,643	2,179,666
1883	216,608	172,200	180,113	128,462	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nashville, Chattanooga and St. Louis:													
1881	178,143	190,866	207,710	183,525	104,430	154,549	150,430	168 317	179,979	172,121	152,059	173,127	2,075,258
1882	170,753	174,974	177,336	154,155	135,556	119,074	160,991	168,304	168,999	180,319	181,336	186,352	1,933,047
1883	197,388	195,262	206,164	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York and New England:													
1881	189,749	173,614	212,019	216,913	217,185	231,518	246,821	280,524	299,573	261,200	240,764	240,063	2,809,255
1882	213,840	217,261	265,222	261,044	289,722	295,392	298,441	346,490	338,347	310,145	276,183	261,082	3,408,169
1883	258,266	231,741	284,869	268,853	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York, Lake Erie and Western:													
1880	1,296,381	1,252,218	1,644,958	1,643,151	1,592,544	1,661,812	1,580,976	1,606,874	1,786,417	1,899,910	1,799.338	1,726,788	19,149,361
1881	1,443,437	1,425,765	1,847,261	1,709,057	1,776,891	1,794,982	1,787,081	1,772,895	1,734,200	1,814,866	1,715,469	1,571,208	20,393.112
1882	1,318,997	1,304,757	.....	.....	.....	.....	.....	.....	.....	1,819,010	1,818,824	1,691,404	20,203,469
1883	1,524,869	1,283,616	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Northern Central:													
1881	386,157	382,657	452,906	487,273	465,588	487,287	440,811	498,008	429,565	449,664	487,160	476,622	5,443,697
1882	407,368	413,551	430,194	435,129	482,607	482,752	509,083	667,488	592,435	550,225	526,685	490,003	5,800,176
1883	499,252	486,865	506,864	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Northern Pacific:													
1881	116,508	78,803	162,984	216,210	312,705	412,024	393,260	434,085	534,363	583,055	475,610	439,724	4,044,576
1882	245,369	268,935	373,141	451,023	616,231	704,617	694,067	727,215	772,838	829,831	761,324	564,749	7,009,344
1883	392,035	373,091	583,400	675,200	.....	.....	.....	.....	.....	.....	.....	.....	.....
Philadelphia and Erie:													
1881	224,303	225,501	285,573	293,323	343,792	350,585	291,669	303,849	276,522	292,392	284,078	282,772	3,454,309
1882	252,727	245,246	265,311	277,851	341,415	347,614	377,206	20,3294	386,455	397,164	369,583	335,513	4,011,413
1883	319,720	295,638	308,069	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis and San Francisco:													
1881	212,435	178,234	262,050	265,298	283,399	260,254	252,333	286,373	279,064	308,569	284,320	287,914	3,160,245
1882	256,784	244,654	274,959	242,806	253,419	240,177	318,613	381,637	336,805	360,900	331,490	339,424	3,582,811
1883	278,321	236,278	351,689	274,011	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Alton and Terre Haute:													
1881	175,725	166,012	201,137	197,447	172,177	165,896	165,393	189,180	196,368	204,338	169,795	171,127	2,112,801
1882	168,987	149,619	177,609	165,401	162,842	142,742	192,017	236,137	217,659	229,962	206,040	184,526	2,245,320
1883	193,614	177,717	204,762	160,805	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Iron Mountain and Southern:													
1881	570,957	560,791	704,002	548,300	479,075	474,302	533,512	644,386	708,325	719,239	687,271	709 498	7,319,744
1882	516,370	501,127	585,008	581,977	519,120	529,700	515,519	675,981	724,160	809,394	843,973	781,305	7,581,635
1883	665,258	522,781	632,228	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul, Minneapolis and Manitoba:													
1881	254,187	159,482	320,962	425,685	382,642	405,322	387,488	414,954	485,736	605,708	508,530	528,262	4,878,960
1882	395,461	418 358	531,071	570,890	858,902	856,417	853,296	801,759	832,776	979,057	913,335	753,515	8,764,770
1883	489,763	389,612	729,844	812,008	.....	.....	.....	.....	.....	.....	.....	.....	.....
Texas and Pacific:													
1881	281,176	260,781	319,928	295,066	281,782	285,105	328,063	381,331	345,790	419,203	369,521	401,058	3,921,569
1882	323,987	278,535	343,442	359,543	409,228	384,713	367,215	439,918	470,613	541,901	619,655	641,044	5,143,179
1883	534,529	416,040	526,901	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union Pacific Railway:													
1881	1,339,799	1,374,740	1,674,860	1,766,894	2,319,238	2,884,774	2.528,826	2,638,659	2,844,357	3,169,530	2,723,608	2,267,004	29,776,899
1882	2,186,020	1,835,620	2,392,593	2,362,004	2,491,590	2,508,453	2,301,000	2,762,107	2,949,112	3,158,337	2,821,070	2,294,000	30,088,109
1883	1,986,535	1,743,207	2,489,405	2,199,231	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wabash, St. Louis and Pacific:													
1881	865,339	813,374	1,109,399	967,033	1,148,669	1,330,944	1,120,615	1,542,124	1,497,246	1,406,029	1,372,360	1,294,657	14,467,790
1882	1,220,965	1,134,768	1,313,776	1,378,191	1,204,864	1,149,632	1,418,837	1,772,544	1,682,382	1,595,680	1,525,715	1,331,952	16,738,360
1883	1,307,783	1,070,758	1,479,236	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

RAILROAD, TRAMWAY AND CANAL DIVIDEND STATEMENT.

Showing the amount of Stock Outstanding, the Dividend Periods and the date of last Dividend.

Marked thus (*) are leased roads.	Stock out-standing.	Divide'd Periods.	Last Dividend Payable.
Albany and Susquehanna*.....100	3 500.000	semi-an	Jan. 1, '83 2
Atchison, Topeka and Santa Fe.....100	56,932,200	q'arterly	May 15, '83 1½
Atlanta and Charlotte Air Line 100	1,700,000	semi-an	Mar. 5, '83 2
Atlanta and West Point.....100	1,232,200	semi-an	Feb.. 1, '83 6½
Atlantic and St. Lawrence*.....100	5,484,000	semi-an	Mar. 15, '83 3½
Augusta and Savannah 100	1,032,200	semi-an	Dec. 4, '82 3¾
Avon, Geneseo & Mount Morris* 100	225,000	semi-an	Jan. 1, '82 3
Baltimore & Hanover.....100	88,805	.....	Apl. 9, '83 3
Baltimore and Ohio.....100	14,792,566	semi-an	May 1, '83 5
" " pref.....100	5,000,000	semi-an	Jan. 1, '83 3
Washington Branch.....100	1,650,000	q'arterly	May 1, '83 5
Berkshire* 100	600,000	annual..	Apl. 2, '83 1¾
Boston and Albany 100	20,000,000	q'arterly	Mar. 31, '83 2½
Boston & New York Air Line pref....100	2,795,227	semi-an	Apl. 15, '83 2
Boston, Concord & Montreal pref*....100	800,000	semi-an	May 15, '83 3
Boston and Lowell.....500	3,792,000	semi-an	Jan. 1, '83 4½
Boston and Maine.....100	7,000,000	semi-an	May 15, '83 4
Boston & Providence.....100	4,000,000	semi-an	May 1, '83 4
Attleborough Branch.....100	131,700	semi-an	Jan. 1, '83 3½
Boston, Revere Beach & Lynn.....100	419,400	semi-an	Jan. 1, '83 3
Buffalo, New York & Erie*.....500	950,000	semi-an	Dec. 1, '82 3
Buffalo, New York & Philadelphia pf. 50	6,000,000	q'arterly	Mar. 1, '83 1½
Camden & Atlantic..... 50	377,400	q'arterly	Nov. 1, '82 4
" " pref.....100	880,650	q'arterly	Nov. 1, '82 3
Camden & Burlington County 100	381,925	semi-an	Jan. 1, '83 3
Canada Southern.....100	15,000,000	.....	Feb. 1, '81 2½
Cape May & Millville*.....50	447,000	semi-an	Dec. 1, '82 3
Catawissa 50	1,159,500	annual	Oct. 1, '82 2½
" pref 0	2,200,000	semi-an	May 16, '83 3½
" new pref.....50	1,000,000	semi-an	May 16, '83 3½
Cayuga and Susquehanna*.....50	589,110	semi-an	Jan. 1, '83 4½
Cedar Rapids & Missouri River*.....100	6,850,400	q'arterly	May 1, '83 1½
" " " " pref..100	769,600	semi an	Feb. 1, '83 3½
Central of Georgia.....100	7,500,000	semi-an	Dec. 26, '82 4
Central Ohio* 50	2,437,950	semi-an	Jan. 31, '83 3
" pref.. 50	411,550	semi-an	Jan. 31, '83 3
Central Pacific 150	59,275,500	semi-an	Feb. 1, '83 3
Cheshire preferred.....100	2,153,300	semi-an	Jan. 10, '83 1½
Chicago and Alton.....100	12,504,600	semi-an	Mar. 1, '83 4
" " pref 100	2,425,400	semi-an	Mar. 1, '83 4
Chicago, Burlington & Quincy.....100	69,814,191	q'arterly	June 15, '83 2
Chicago, Iowa & Nebraska* 100	3,916,200	semi-an	Jan. 1, '83 4
Chicago, Milwaukee & St. Paul 100	27,904,261	semi-an	Apl. 16, '83 3½
" " " pref...100	16,447,483	semi-an	Apl. 16, '83 3½
Chicago & Northwestern.... 100	16,737,655	semi-an	Dec. 27, '82 3½
" " pref.....100	22,210,844	q'arterly	Mar. 27, '83 2
Chicago, Rock Island & Pacific.....100	41,960,000	q'arterly	May 1, '83 1¾
Chicago & West Michigan.....100	6,796,800	semi-an	Feb. 15, 83 3
Chicago, St. Paul, Minn. & Omaha pf..100	11,396,600	q'arterly	Apl. 20, '83 1¾
Cincinnati, Hamilton & Dayton 100	3,500,000	semi-an	Jan. 5, '83 3
Cincinnati, Ind., St. Louis & Chicago.100	8,000,000	q'arterly	Jan. 15, '83 1½
Cincinnati, Sandusky & Cleveland pf. 50	428,850	semi-an	May 1, '83 3
Cleveland Columbus, Cincin. & Ind..100	14,991,800	.....	Feb. 1, '83 2
Cleveland & Pittsburg*..... 50	11,235,430	q'arterly	June 1, '83 1¾
Columbus & Xenia*..... 50	1,786,200	q'arterly	June 10, '83 2
Columbus, Hocking Valley & Toledo 100	10,316,500	.....	Jan. 10, '83 2½
Concord 50	1,500,000	semi-an	May 1, '83 5
Concord and Portsmouth*.....100	350,000	semi-an	Jan. 1, '83 3½
Connecticut & Passumpsic Rivers.....100	2,244,400	semi-an	Feb. 1, '83 3
Connecticut River.....100	2,370,000	semi-an	Jan. 1, '83 4
Cumberland Valley.....50	1,292,950	q'arterly	Apl. 2, '83 2½
" 1st pref.....50	241,900	semi-an	Apl. 2, '83 4
" 2d pref. 50	243,000	semi-an	Apl. 2, '83 4
Danbury & Norwalk.....50	600,000	semi-an	Apl. 1, '83 2½
Dayton and Michigan*.....50	2,402,573	semi-an	Apl. 1, '83 1¾
" " pref. 50	1,211,250	q'arterly	Apl. 1, '83 2
Delaware*..... 25	1,468,940	semi-an	Jan. 2, '83 3
Delaware & Bound Brook*..... 100	1,652,000	q'arterly	May 14, '83 1¾
Delaware, Lackawanna & Western 50	26,200,000	q'arterly	Apl. 20, '83 2
Denver & Rio Grande..... 100	33,000,000	q'arterly	Jan. 14, '82 1½
Detroit, Lansing & Northern.....100	1,825,600	semi-an	Feb. 15, '83 3
" " " pref.....100	2,503,380	semi-an	Feb. 15, '83 3
Dubuque & Sioux City*..... 100	5,000,000	semi-an	Apl. 16, '83 3
East Pennsylvania*..... 50	1,709,550	semi-an	Jan. 18, '83 3
East Mahanoy*..... 50	392,950	semi-an	Jan. 1, '83 3
Eastern (N. H.).....100	492,500	semi-an	Dec. 15, '82 2¼
Eel River.....100	3,000,000	q'arterly	Mar. 5, '83 1
Elmira & Williamsport*..... 50	500,000	semi-an	May 1, '83 2½
" " pref..... 50	500,000	semi-an	Jan. 1, '83 3½
Erie and Pittsburgh*..... 50	1,998,400	q'arterly	June 10, '83 1¾
European & North American.....100	2,500,000	semi-an	Apl. 1, '83 2½
Evansville & Terre Haute.... 50	3,100,000	.....	Jan. 1, '83 6b
Fitchburg.....100	4,950,000	semi-an	Jan. 1, '83 3
Flint & Pere Marquette pref.....100	6,500,000	semi-an	Jan. 15, '83 3½
Fort Wayne & Jackson pref.....100	2,284,800	.....	May 4, '82 2
Georgia. 100	4,200,000	q'arterly	Apl. 15, '83 2½
Granite.....100	1,250,000	semi-an	Jan. 1, '83 3
Greenwich & Johnsonville..... 100	118,000	semi-an	Jan. 1, '83 4
Hannibal & St. Joseph pref.....100	5,083,024	semi-an	Feb. 15, '83 3
Harrisburg & Lancaster.... 50	1,182,500	semi-an	Jan. 10, '83 3½
Hartford & Connecticut Western 100	2,700,000	.....	Dec. 1, '82 1½
Housatonic pref. 100	1,180,000	q'arterly	Apl. 15, '83 2
Illinois Central.....100	39,000,000	semi-an	Mar. 1, '83 4
Iowa Falls & Sioux City*.....100	4,623,500	q'arterly	Mar. 1, '83 1¾
Iowa R.R.& Land Co..... 100	7,620,000	q'arterly	May 1, '83 1
Jeffersonville, Madison & Indi'apolis.100	2,000,000	q'arterly	May 1, '82 1¾
Joliet and Chicago*..... 100	1,500,000	q'arterly	Apl. 1, '83, 1¾
Kansas City, Fort Smith & Gulf.....100	4,648,000	.....	Feb. 15, '83 3
" " " pref.100	2,750,000	semi-an	Feb. 15, '83, 4
Lake Shore & Michigan Southern 100	49,466,500	q'arterly	May 1, '83, 2
" " (guar.)..100	533,500	semi-an.	Feb. 1, '83, 5
Lawrence*..... 50	450,000	q'arterly	Apl. 1, '83, 2

Marked thus (*) are leased roads.	Stock out-standing.	Divide'd Periods.	Last Dividend Payable.
Lehigh Valley..... 50	27,496	q'arterly	Apl. 16, '83 2
" pref..... 50	106	q'arterly	Apl. 16, '83 2½
Little Miami..... 50	4,637,300	q'arterly	June 10, '83 2
Little Schuylkill*.. 50	2,646,100	semi-an.	Jan. 12, '83 3½
Long Island. 50	10,000,000	q'arterly	May 1, '83 1
Louisville & Nashville.....100	25,000,000	semi-an.	Feb. 1, '82 3
Lowell & Andover.....100	500,000	semi-an.	Jan. 1, '83 3½
Lykens Valley 20	600,000	q'rterly.	Jan. 3, '83 2½
Maine Central.....100	3,603,300	semi-an.	Feb. 15, '83 2½
Manchester & Lawrence.....100	1,000,000	semi-an.	May 1, '83 5
Manhattan 100	13,000,000	.....	.....
" 1st pref.....100	6,500,000	q'rterly.	Apl. 2, '83 1½
" 2d pref.....100	6,500,000	q'rterly.	Jan. 2, '83 1½
Marquette, Houghton & Ontonagon...100	2,756,600	....	Feb. 15, '83 4
" " pref.100	2,259 026	semi-an.	Feb. 15, '83 4
Massawippi*.... 100	400,000	semi-an.	Feb. 1, '83 3
Metropolitan 100	6,500,000	q'rterly	Oct. 2, '82 1½
Michigan Central.....100	18,738,204	semi-an.	Feb. 1, '83 2
Middlesex Central.....100	280,000	semi-an.	Feb. 1, '83 3
Mill Creek & Minehill*. 50	323,000	semi-an.	Jan. 1, '83 5
Mine Hill & Schuykill Haven*..... 50	4,022,500	semi-an.	Jan. 12, '83 3½
Missouri Pacific.....100	30,000,000	q'rterly.	Apl. 2, '83 1¾
Morris and Essex.... 50	15,000,000	semi-an.	Jan. 2, '83 3½
Mount Carbon & Port Carbon..... 50	282,350	semi-an.	Jan. 2, '83 6
Nashua and Lowell..... 100	800,000	semi-an.	May 1, '83 4
Nashua & Rochester.....100	1,305,800	semi-an.	Apl. 2, '83 1½
Nashville & Decatur.....100	1,356,632	semi-an.	Dec. 10, '82 3
Nashville, Chattanooga & St. Louis... 25	6,670,325	semi-an.	Apl. 20, '82 1½
Naugatuck 100	2,000,000	semi-an.	Jan. 15, '83 5
Nesquehoning Valley*..... 50	1,300,000	semi-an.	Mar. 1, '83 3
New Castle & Beaver Valley*... 50	700,000	q'rterly.	Apl. 1, '83 —
New London Northern*..... 100	1,500,000	q'rterly.	Apl. 1, '83 1½
New York Central & Hudson River....100	89,428,330	q'rterly.	Apl. 15, '83 2
New York and Harlem.....100	8,500,000	semi-an.	Jan. 2, '83 4
" " pref.....100	1,500,000	semi-an.	Jan. 2, '83 4
" City Line..... —	.....	annual	Apl. 2, '83 2
New York, Lackawanna & Western...100	10,000,000	q'rterly.	Apl. 2, '83 1¾
New York, Lake Erie & Western.....100	77,087,600	.....	.....
" " " pref....100	7,987,500	annual..	Jan. 2, '83 6
New York, New Haven & Hartford....100	15,500,000	semi-an.	Jan. 2, '83 5
New York, Ontario & Western pref....100	2,000,000	.....	Mar. 1, '83 12
New York, Providence & Boston.....100	3,000,000	q'rterly.	May 10, '83 2
Niagara Bridge & Canandaigua* 100	1,000,000	semi-an	Apl. 1, '83 3
North Carolina*.....100	3,000,000	semi-an.	Mar. 1, '83 3
" " pref.....100	1,000,000	semi-an.	Mar. 1, '83 3
Norfolk & Western pref..... —	15,000,000	q'rterly.	Dec. 15, '82 $1
Northeastern (South Carolina)..... 50	899,350	.....	Apl. 2, '83 3
North Pennsylvania..... 50	4,399,750	q'rterly.	May 25, '83 1¾
Northern Central..... 50	6,500,000	semi-an.	Jan. 15, '83 4
Northern New Hampshire.....100	3,068,400	semi-an.	Dec. 1, '82 3
Northern Pacific pref.....100	41,909,132	.....	Jan. 15, '83 11.1
Norwich & Worcester*..... 100	2,604,400	semi-an.	Jan. 10, '83 5
Oregon & Transcontinental.....100	40,000,000	q'rterly.	Apl. 10, '83 1½
Old Colony 100	7,533,800	semi-an.	Jan. 1, '83 3½
Oregon Improvement Co.....100	5,000,000	semi-an.	Mar. 1, '83 3½
Oregon Railway & Navigation Co.... 100	13,000,000	q'rterly.	May 1, '83 2½
Oswego & Syracuse.....100	1,320,400	semi-ap.	Feb. 1, '83 4½
Panama 100	7,000,000	semi-an	Jan. 10, '83 6½
Paterson & Hudson*.....100	630,000	semi-an.	Jan. 3, '83 4½
Paterson & Ramapo.....100	248,000	semi-an.	July 1, '82 4
Pemberton & Hightstown*..... ... 20	342,150	semi-an.	Jan. 1, '83 3
Pennsylvania..... 50	85,751,550	semi-an.	May 29, '83 4
Pennsylvania Co.. 50	20,000,000	annual	Dec. 15, '82 4
Peoria & Bureau Valley*.....100	1,500,000	semi-an.	Feb. 1, '83 4
Philadelphia, Ger. & Norrist'n*..... 50	2,231,900	q'rterly.	June 3, '83 3
Philadelphia and Trenton.....100	1,250,100	q'rterly.	Apl. 10, '83 2½
Philadelphia, Wilmington and Balt... 50	11,795,050	semi-an.	Jan. 2, '83 4
Pittsburgh, Fort Wayne & Chicago*..100	19,714,285	q'rterly.	Apl. 2, '83 1¾
" Special Imp... 100	7,698,900	q'rterly.	Apl. 3, '83 1¾
Pittsfield & North Adams.....100	450,000	semi-an.	Jan. 1, '83 2½
Portland, Saco & Portsmouth..... 100	1,500,000	semi-an.	Jan. 15, '83 3
Providence & Worcester.....100	2,500,000	semi-an.	Jan. 1, '83 3
Rensselaer & Saratoga*.....100	6,854,100	semi-an.	Jan. 2, '83 4
Richmond & Danville.....100	5,000,000	q'rterly.	Aug. 15, '82 2
Richmond & Petersburg 100	1,009,300	semi-an.	Aug. 1, '82 2
Rochester & Genesee Valley*.....100	555,200	semi-an.	Jan. 1, '83 3
Rome, Watertown & Ogdensburg.. 100	5,293,900	.....	Jan. 1, '83 3
Rutland preferred.....100	4,000,000	semi-an.	Sept. 1, '82 1
Spuyten Duyvil & Port Morris..... ..100	989,000	semi-an.	Jan 2, '83 4
St. Louis, Alton & Terre Haute pref..100	2,468,406	.....	May 1, '83 7
St. Louis & San Francisco 1st pref....100	4,500,000	semi-an.	Feb. 1, '83 3½
St. Louis, Jacksonville & Chicago....100	1,293,000	.....	Aug. 1, '82 4½
" " " pref..100	1,034,000	.....	Aug. 1, '82 4½
St. Paul & Duluth pref.....100	5,121,700	semi-an.	Jan. 1, '83 3½
St. Paul, Minneapolis & Manitoba... 100	20,000,000	q'rterly.	May 1, '83 2
Schuylkill Valley*..... 50	576,050	semi-an.	Jan. 15, '83 2½
Seaboard & Roanoke.....100	1,302,200	semi-an.	May 1, '83 5
Shamokin Valley & Pottsville... 50	869,450	semi-an.	Feb. 1, '83 3
Shore Line*.....100	1,000,000	semi-an.	Jan. 6, '83 4
Sioux City & Pacific pref.....100	169,000	semi-an.	Apl. 2, '83 3½
South Branch (N. J.)*.....100	438,300	semi-an.	Jan. 2, '83 3
South Western (Ga.)*.....100	5,031,700	semi-an.	Dec. 26, '82 3½
Stockbridge & Pittsfield*.....100	448,700	q'rterly.	Apl. 2, '83 1½
Sunbury & Lewistown..... 50	161,000	semi-an.	Apl. 2, '83 3
Syracuse, Binghamton & New York*..100	2,500,000	semi-an.	Feb. 1, '83 2
Terre Haute & Indianapolis.....100	1,988,150	semi-an.	Feb. 1, '83 4
Union Pacific 100	60,854,105	q rterly.	Apl. 1, '83 1¾
United Companies of New Jersey*....100	21,090,400	q'rterly.	Apl. 10, '83 2½
Utica, Shenango & Susq. Valley.....100	4,000,000	semi-an.	Nov. 1, '82 3
Utica and Black River.....100	1,772,000	semi-an.	Mar 31, '83 2
Vermont and Massachusetts.....100	3,050,000	semi-an.	Apl. 7, '83 3
Vermont Valley..... 100	1,000,000	annual	Jan. 2, '83 3

RAILROAD, TRAMWAY AND CANAL DIVIDEND STATEMENT.

(CONTINUED.)

Showing the amount of Stock Outstanding, the Dividend Periods and the date of last Dividend.

Marked thus (*) are leased roads.	Stock out-standing.	Divide'd Periods.	Last Dividend Payable.
Ware River*.....100	750,000	semi-an.	Jan. 3, '83 3½
Warren (N. J.).....100	1,800,000	semi-an.	Apl. 1, '83 3½
West Jersey.....50	1,375,800	semi-an.	Mar. 15, '83 38
Wilmington & Weldon.....100	2,082,400	semi-an.	Jan. 15, '83 3
Wilmington, Columbia & Augusta....100	960,000	semi-an.	Jan. 10, '83 3
Winchester & Potomac*.....100	180,000	semi-an.	Jan. 1, '83 3
Winchester & Strasburg*.....100	74,700	semi-an.	Jan. 1, '83 3
Worcester & Nashua.....75	1,789,800	semi-an.	Jan. 1, '83 1⅞
TRAMWAYS.			
Baltimore City.....25	1,000,000	annual	Jan. 1, '83 3
Baltimore, Catonsville & El. Mills....100	80,000	semi-an.	Jan. 1, '83 2½
Bleecker Street & Fulton Ferry.....100	900,000	semi-an.	July 1, '82 ¾
Boston & Chelsea pref.....50	110,000	semi-an.	Apl. 2, '83 3
Broadway (Brooklyn).....100	250,000	semi-an.	Apl. 1, '83 3
Broadway & 7th Avenue (New York)..100	2,100,000	q'arterly	Apl. 1, '83 2
Brooklyn City & Newtown.....100	880,600	q'arterly	Apl. 1, '83 3
Brooklyn City.....100	2,000,000	semi-an.	May. 1, '83 3½
Bushwick (Brooklyn).....100	400,000	q'arterly	Apl. 1, '83 3
Cambridge (Mass.).....100	908,000	semi-an.	Apl. 2, '83 4½
Central Park, North & East River.....100	1,800,000	q'arterly	Apl. 1, '83 2
Christopher & Tenth Street.....100	650,000	q'rterly.	Feb. 1, '83 2½
Citizens' (Phil.).....50	192,500	semi-an.	Apl. 1, '83 2½
Citizens' (Pbg.).....50	200,000	q'rterly.	.. ....'80 14½
Coney Island & Brooklyn.....100	500,000	annual..	Apl. 1, '83 4
Continental (Phil.).....50	589,000	semi-an.	Jan. 1, '83 –
Dry Dock, East Broadway & Battery..100	1,200,000	semi-an.	May 1, '83 3
Eighth Avenue (New York).....100	1,000,000	q'arterly	Apl. 1, '83 3
Forty-second St. & Grand St. Ferry...100	748,000	q'rterly.	May 1, '83 6
Frankford & Southwark (Phila.).....50	600,000	semi-an.	Apl. 1, '83 4
Germantown, (Phila.).....50	1,540,902	q'rterly.	Apl. 1, '83 2¼
Girard College (Phila.).....50	500,000	q'rterly.	July 1, '71 3
Grand Street & Newtown.....100	170,000	semi-an.	Jan. 1, '83 2½
Green & Coates Street (Phila.).....50	708,650	semi-an.	Apl. 1, '83 3
Hestonville, Mantua & Fairmount ...50	299,381	q'rterly.	Jan. 1, '75 4
Highland (Boston).....100	600,000	semi-an.	Jan. 1, '83 4
Lombard & South Streets (Phila.).....25	195,000	semi-an.	Oct. 1, '75 4
Lynn and Boston.....100	200,000	semi-an.	May 1, '83 4
Metropolitan (Boston).....50	1,500,000	semi-an.	Jan. 1, '83 4
Middlesex (Boston).....100	650,000	semi-an.	May 15, '83 3½
Ninth Avenue (New York).....100	797,320	semi-an.	....
People's (Phila.) pref.....25	115,250	.....	July 1, '82 2
Philadelphia City.....50	475,000	semi-an.	July 1, '82 4
Philadelphia and Darby.....20	200,000	semi-an.	July 1, '81 3½
Philadelphia & Grey's Ferry.....50	308,000	semi-an.	Jan. 1, '82 6
Pittsburgh, Allegheny & Manchester. 50	300,000	q'rterly.	Oct. 1, '81 3
Ridge Avenue (Phila.).....50	420,000	semi-an.	Apl. 1, '83 5½
Second Avenue (New York).....100	1,199,500	semi-an.	Jan. 1, '83 2½
Second & Third Streets (Phila).....50	771,076	q'rterly.	Apl. 1, '83 4
Seventeenth & Nineteenth sts (Phila.). 50	250,000	semi-an.	July 1, '81 3
Sixth Avenue (New York).....100	750,000	semi-an.	May 1, '83 4½
Somerville (Boston).....100	113,000	semi-an.	May 1, '83 3
South Boston.....50	600,000	semi-an.	Jan. 1, '83 4
Third Avenue, (New York).....100	2,000,000	q'rterly.	May 1, '83 5
Thirteenth & Fifteenth Sts. (Phila.)... 50	334,529	q'rterly.	Apl. 1, '83 4
Twenty-third Street (New York).....100	600,000	semi-an.	Feb. 1, '83 4
Union, (Boston).....100	374,300	semi-an.	Jan. 2, '82 4
Union, (Phila.).....50	751,100	semi-an.	Jan. 1, '83 –
West Philadelphia.....50	750,000	semi-an.	July 1, '77 10
CANALS.			
Chesapeake and Delaware.....50	2,078,038	semi-an.	June 1, '75 2
Delaware Division.....50	674,950	semi-an.	Feb. 15, '83 2
Delaware and Hudson.....100	20,000,000	q'rterly.	Mar. 11, '83 1¾
Delaware & Raritan*.....100	5,847,400	q'rterly.	Apl. 10, '83 2½
Lehigh Coal and Navigation.....50	11,273,400	semi-an.	Dec. 13, '82 2
Monongahela Navigation.....50	1,004,500	semi-an.	Jan. 1, '83 $3
Morris, consolidated.....100	1,025,000	semi-an.	Feb. 1, '83 2
" preferred.....100	1,175,000	semi-an.	Feb. 1, '83 5
Pennsylvania.....50	4,501,200	.....	.....
Schuylkill Navigation com.*.....50	859,100	annual..	Oct. 15, '82 50c.
" " pref.....50	3,200,000	annual..	Oct. 15, '82 $1
MISCELLANEOUS.			
Adams Express.....100	12,000,000	q'rterly.	June 1, '83 2
American Express.....50	18,000,000	semi-an.	Jan 2, '83 3
Calumet & Hecla Mining Co.....50	100,000 S.	q'rterly.	May 15, '83 $5
Central Mining Co.....100	.....	annual.	Feb. 15, '83 $3
Consolidation Coal.....100	10,250,000	semi-an.	Jan. 27, '82 2
George's Creek Coal & Iron.....100	.....	semi-an.	Jan. 1, '83 3
Maryland Coal.....100	4,400,000	semi-an.	Feb. 1, '76 1½
Missouri Valley Land Co.....100	200,000	semi-an.	Jan. 1, '83 $6
National Tube Works.....100	2,000,000	q'rterly.	Apl. 2, '83 2
Pacific Mail Steamship.....100	20,000,000	q'rterly.	May 1, '83 3
Pennsylvania Coal.....50	5,000,000	q'rterly.	May 15, '83 2
Pullman Palace Car.....100	10,000,000	q'rterly.	May 15, '83 2
Quicksilver, com.....100	5,708,700	.....	May 1, '82 2 0.4
" pref.....100	4,291,300	.....	May 1, '82 6
Quincy Mining Co.....25	40,000 shs	semi-an.	Feb. 15, '83 $6
Quincy Railroad Bridge.....100	1,750,000	semi-an.	Jan. 1, '83 5
Sioux City & Iowa Falls L. & L. Co....100	500,000	semi-an.	Jan. 1, '83 3½
Spring Mountain Coal.....100	1,500,000	semi-an.	Dec. 11, '82 3½
Topeka Equipment Co.....100	255,500	semi-an.	Apl. 2, '83 5
United States Express.....100	7,000,000	q'rterly	May 1, '83 1
Wells, Fargo & Co. Express.....100	6,250,000	semi-an.	Jan. 1, '83 4
Western Union Telegraph.....100	80,000,000	q'rterly.	Apl. 1, '83 1¼

FINANCIAL AND COMMERCIAL DEPARTMENT.

NEW YORK, MONDAY, MAY 14, 1883.

RATES for call loans on stocks as collateral during the forenoon were 4 per cent, and for the remainder of the day were 3½ and 4 per cent; in the last hour they were 3½ and 4 per cent. Money continued easy and abundant during the entire day.

Foreign exchange was dull, and but a small volume of business transacted. The posted rates were 4.84 for sixty days, and 4.87½ for three days; the actual rates were as follows: sixty days, 4.83@4.83¼; demand, 4.86½@4.86¾; cables, 4.87½@4.87¾; commercial bills, 4.81½@4.82.

The posted rates for continental bills of the leading drawers were: Paris, francs, 5.18¾ for sixty days, and 5.16¼ for three days; Antwerp, francs, 5.19⅜ and 5.16⅛; Zurich, francs, 5.18¾ and 5.16¼; Berlin, Bremen and Hamburg, reichsmarks, 95 and 95½; Amsterdam, guilders, 40⅛ and 40⅜. The actual rates were: francs, 5.20⅝@5.21¼ and 5.18¼@5.18⅜; reichsmarks, 94⅜@94½ and 94⅞@95; guilders, 39 15-16@40 and 40 3-16@40¼.

The quotations for United States bonds at the close were: 3 per cents, 103¼@103½; 4s, 1907, coupon, 119⅛@119¼; do. reg., 119⅛@119¼; 4½s, 1891, coupon, 113@113¼; do. reg., 112@112⅛; 5s, continued at 3½ per cent, 103@—; currency 6s, 1895-'99, 127@133.

The interest-bearing debt of the United States, April 30, 1883, is $1,348,478,000; debt on which interest has ceased since maturity, $9,091,085.26; debt bearing no interest, $525,958,975.81; interest, $9,711,225.79 —total debt and interest, $1,893,239,286.86. Of the debt bearing interest, $54,948,100 are bonds bearing interest at five per cent, continued at three and one-half per cent; $250,000,000 at four and one-half per cent; $737,571,650 at four per cent; $300,589,300 at three per cent; $368,950 refunding certificates, four per cent; $14,000,000 Navy Pension Fund, four per cent. The debt bearing no interest consists of: Old demand and legal tender notes, $346,740,051; certificates of deposit, $10,105,000; gold and silver certificates, $162,104,951; fractional currency, $7,008,973.81. The cash in the treasury amounts to $319,159,401.35; and the total debt, less cash in treasury, to $1,574,079,885.51, against $1,576,931,288.16 on the first of April, 1883, a decrease during the month of $2,851,402.65, and a decrease since the 30th of June, 1882, of $114,834,575.21. The cash balance available, May 1, 1883, amounts to $135,283,026.88.

The Pennsylvania Railroad Company has declared a semi-annual dividend of four per cent upon the capital stock of the company clear of all taxes, payable on and after May 29, 1883, to shareholders as registered on the books at 3 P. M., April 30th ult. The said dividend will be paid in the proportion of two per cent in cash and two per cent in scrip, redeemable in cash upon its delivery, or convertible into the capital stock of the company at par prior to August 1st, 1883, when presented in sums of fifty dollars. The stockholders will also have the option of subscribing at par to the stock of the company, in the proportion of four per cent of the number of shares registered in their names April 30, 1883. Those who are entitled to a fraction of a share can subscribe for a full share. All subscriptions must be made and paid for in full on or before June 15, 1883, as no subscriptions will be received after that date. The privilege of taking new stock may be sold by shareholders, and blank forms of allotments will be furnished upon application. The present capital of the company is $85,751,550; and these two privileges, if fully availed of by the stockholders, it is estimated will yield $5,145,093. To provide the remainder of the money necessary, a 4½ per cent collateral trust loan, due in 30 years, has been negotiated upon favorable terms. The aggregate value to the shareholders of the dividend and the two stock privileges is estimated at about five and one-half per cent.

The gross receipts of the Philadelphia and Reading Railroad

Company for the month of March, 1883, were $1,669,240.91, the expenses $978,497.64, and the net profit $690,743.27 – a gain, compared with the corresponding month of last year, of $90,303.55; the gross receipts of the Coal and Iron Company were $1,160,483.12, the expenses $1,148,724.59, and the net $11,758.53 —making the net profit of both companies for the month, $702,501.80, an increase of $47,053.17 as compared with the corresponding month last year. The profit of both companies for the first four months of the fiscal year, which commenced December 1, 1882, was $2,841,243.73, an increase as compared with the corresponding period of last year of $162,682,70.

The count of the money in the United States Treasury at Washington, which commenced on the 31st of March, was concluded on the 19th ult. The committee found the various sums belonging to the cash of the office to aggregate $13,469,297 53; the reserve, consisting of United States notes and certificates not yet issued, $75,440,218; United States bonds to secure public deposits with national banks, $16,849,000; United States bonds to secure circulation of national banks, $357,201,400; Indian and other trust funds, $4,418,716.

The value of the exports of breadstuffs from the United States in March, 1883, was $17,802,275, and in March, 1882, $12,414,906. In 3 months ended 31st of March, 1883, $49,410,862, and in same time of 1882, $35,567,623. In 9 months ended 31st March, 1883, $167,233,418, and in same period of previous year $147,711,538.

According to the report of the Chief of the Bureau of Statistics the total values of the exports of domestics, provisions, tallow and dairy products during the month of March, 1883, and during the three months ended March 31, 1883, as compared with similar exports during the corresponding periods of the preceding year, were as follows: March, 1883, $9,941,425; March, 1882, $7,993,329. Three months ended March, 1883, $30,050,303; three months ended March 31, 1882, $30,440,290. Provisions and tallow for five months ending March 31, 1883, $46,143,021; five months ending March 31, 1882, $48,103,255. Dairy products for eleven months ending March 31, 1883, $12,093,972; eleven months ending March 31, 1882, $17,456,313.

From the report of the Horn Silver Mining Company, of Utah, we learn that the output of the mine for the year ending December 30, 1882, was 44,782.13 tons of ore. The average assay was 37.8 per cent lead and 34.2 ounces silver per ton. Net tons of lead, 16,924.52; net ounces of silver, 1,551,870.11. The sales of lead amounted to $1,326,694.23; of silver, $2,010,125.77; ore, $32,879.87; receipts from all sources to credit of mine, $3,385,811.68. The cost of mining was about $4.44 per ton, or $209,805.08; smelting, $788,048.02; refining, $115,405.13 (about $9.05 per ton); freight on bullion and ores to Salt Lake, $287,168.70; total payments on account mining, smelting, refining and all working expenses, $1,800,230.92. The balance to the credit of the mine January 1, 1882, was $294,195.40. Dividends paid in 1882, $1,200,000. Material on hand at 'Frisco, Francklyn and Chicago, December 31, 1882, $64,620.15; accounts due company, $536,194.91; construction payments, $32,313.71; Utah Central Railway Company, open account, $1,744.57; cash on hand, $44,902.82. The total assets of the company (including bullion en route, $99,997.62; base bullion at Chicago, $39,980.42; in furnace, $22,893.83; lead shipped, $48,045.14; silver bars ready for shipment, $24,622.68; ore on hand, $109,220.79, and silver in Assay Office, New York, $47,742.24,) amounted to $1,137,297.29. The company is free from debt.

The stockholders of the Old Colony Railroad Company have voted to issue $500,000 in notes and bonds to meet maturing indebtedness, also to increase the capital stock to $12,000,000.

The returns published in the official journal show the total value of exports from Mexico for the last fiscal year to be $29,083,000. The value of exports to the United States was nearly $14,000,000, and of those to England $10,000,000. Half the exports were shipped from Vera Cruz. The exports of sugar and tobacco were valued at only $617,000.

The Camden and Amboy Railroad 6s of 1883 and the United Railroads of New Jersey 6s of 1883 having matured, have been replaced on the Philadelphia Stock Exchange list by the United Companies of New Jersey consolidated mortgage gold 6s and general mortgage gold 4s.

The capital stock of the Tionesta and Clearfield Railroad Company has been increased from $1,000,000 to $1,500,000, the proceeds to be used in completing the construction and equipment of the road.

Judgment was rendered in the Court of Claims at Washington on the 15th ult. in favor of the Chicago, Milwaukee and St. Paul Railway Co., for $17,585, being balance due on a contract for carrying the mails.

THE latest recorded sales of stocks and bonds at the New York, Philadelphia, Boston and Baltimore Stock Exchanges are as follows:

NEW YORK.

Atchison, Colorado and Pacific 1st, 90½; American Express, 92; Adams Express, 128; American District Telegraph, 30; American Cable, 69; Atlantic and Pacific inc., 32; do. W. D. 1st, 100; Alabama, Class A, 83; Arkansas 7s, Central R. R., 20.

Boston and New York Air Line pref., 84½; Burlington, Cedar Rapids and Northern, 81; do. 1st, 101¾; Buffalo, New York and Philadelphia 1st, 102¾.

Chicago, St. Louis and Pacific, 21; do. pref., 56½; Canadian Pacific, 61¾; Cairo and Fulton 1st, 109; Canada Southern, 65¾; do. 1st, guar., 98; Central Iowa 1st, 109; Central of New Jersey, 78½; do. conv. ass., 115; do. inc., 91½; do. 1st, 1890, 117; do. consol. ass., 116; do. adj., 104¾; Central Pacific, 74⅞; do. 6s, 114¾; do. Cal. and Oregon 1st, 104; do. San Joaq. 1st, 108½; do. L. G., 104½; Chicago and Alton, 132¾; do. pref., 140½; Chicago and Northwestern, 134; do. pref., 151; do. consol. coup. gold, 126½; do. 1st mort., 106; do. S. F. 5s, 101; do. S. F. 7s, 106; Chicago, Milwaukee and St. Paul, 104½; do. pref., 120¾; do. 7s, go'd, 126½; do. 8s, 1st, 132; do. consol., 122¾; do. 2d, 101½; do. Southern Minn. div. 1st, 108½; do. La Crosse div. 1st, 119¾; do. Chicago and Pacific Western div. 1st, 95¼; Chicago, St. Paul, Minneapolis and Omaha, 49½; do. pref., 107; do. consol., 110; Chicago, Burlington and Quincy, 124½; do. consol. 7s, 128½; do. Iowa div. 4s, 87¾; Chicago, Rock Island and Pacific, 123½; do. 6s, 1917, 125¾; Cleveland, Columbus, Cincinnati and Indianapolis, 68¾; do. 1st, 121½; Columbia and Greenville pref., 67; Colorado coal and iron, 35½; do. 1st, 85¾; Chesapeake and Ohio, 21; do. 1st pref., 32¼; do. 2d pref., 23¾; do. cur. 6s, 52½; do. 6s, 1911, 101; do. pur. money fund, 115; do. 1st, Series B, 91⅞; Columbus, Chicago and Indiana Central, 4¾; do. inc. reorganization certif., 74; Cleveland and Pittsburgh consol. S. F., 122¼; Cleveland, Painesville and Ashtabula 7s, 112; Chicago, St. Louis and New Orleans 5s, 106¼; do. 1st, 116¼; Columbus, Hocking Valley and Toledo, 1st, 83;

Delaware, Lackawanna and Western, 125⅞; Delaware and Hudson Canal, 109¾; do. 7s, 1894, 115¼; do. 7s, 1891, reg., 115½; do. 7s, 1884, 104; Denver and Rio Grande, 45⅝; do. 1st, 110¼; do. consol., 99¼; Dubuque and Sioux City, 85½.

East Tennessee, Virginia and Georgia, 9¾; do. pref., 20⅞: do. inc., 38⅞; do. 5s, 78¼; Elizabeth City and Northern 1st, 80; Elizabethtown, Lexington and Big Sandy 6s, 95; Erie 7s consol. gold, 126½.

Fort Worth and Denver 1st, 75¼.

Green Bay, Winona and St. Paul, 8½; Great Western 2d, 99¾; Gulf, Colorado and Santa Fe 1st, 113.

Houston and Texas Central, 75; do. 1st M. L., 109¾; do. gen'l mort., 99; Hannibal and St. Joseph, 43; do. pref., 94¾; do. 8s, consol., 105½; do. 6s, consol., 111½.

Illinois Central, 144; Illinois Leased Line, 81; Indiana, Bloomington and Western, 29; do. 1st pref., 119; do. 1st mort., 89; do. Eastern div. 6s, 92⅞; International and Gt. Northern 1st, 108; do. coupon 6s, 87; Iowa Midland 8s, 129; Indianapolis, Decatur and Springfield 1st, 100.

Kansas Pacific 1st consol., 99; do. 6s, Denver div. ass., 106¾; Keokuk and Des Moines 1st, 102½.

Lake Shore and Michigan Southern, 109⅞; Lake Erie and Western, 29; do. 1st, 100; do. inc., Sandusky div., 37½; Louisville and Nashville, 50¾; do. St. Louis div. 1st, 104; do. gen'l mort. 6s, 94⅞; do. consol., 115½; do. 2d mort., 100; Long Island, 67: do. consol. 5s, 97½; Louisville, New Albany and Chicago, 1st, 101½; Lehigh and Wilkesbarre consol. ass., 105.

Missouri 6s, 1888, 111¼; do. 6s, 1886, 108½; Michigan Southern S. F., 104 Mobile and Ohio 1st mort., 109½; do. 1st deben., 74; Milwaukee and Northern 1st, 97; Manhattan Co., 44¾; Manhattan Beach, 25; Memphis and Charleston, 42; Michigan Central, 93⅞; do. 7s, 123; do. 5s, 103; Missouri, Kansas and Texas, 30¾: do. consol. 7s, 109½; do. 2d, 60; do. gen'l mort. 6s, 84½; Missouri Pacific, 104½; do. 1st consol, 105; Morris and Essex, 128; do. 1st, 134½; do. 2d, 114; do. consol., 124; do. 7s, 1871, 120; Marietta and Cincinnati 1st pref., 12½; Milwaukee, Lake Shore and Western pref., 46; do. 1st, 100; do. inc., 80; Mutual Union Telegraph, 20; do. 6s, 89½; Metropolitan Elevated, 81½; do. 1st, 99¾; do, 2d, 85; Minneapolis and St. Louis pref., 59; do. 1st Iowa Ext., 118; Midland New Jersey 1st, 91¾; do. 4-5-6, 89¾.

Nashville, Chattanooga and St. Louis, 53½; do. 1st, 119½; New York Cen.

tral and Hudson River, 121¾; do. 5s, ext., 102¾; do. 1st coup., 130⅞; do. 6s, 1887, 107¼; New York, Chicago and St. Louis, 11½; do. pref., 26¾; do. 1st, 102 New York, Lake Erie and Western, 36; do. 2d consol., 99; do. 2d 5s funded 98; New York, Ontario and Western, 27¼; Norfolk and Western, 13; do. pref., 42; do. gen'l mort., 100½; Northern Pacific, 51; do. pref., 88½; do. 1st, 106¼; New Orleans Pacific 1st, 89¾; New York, Lackawanna and Western, 88⅞; do. 1st, 116; New York, Susquehanna and Western, 8½; do. pref., 21½; do. 1st, 81½; New Central Coal, 13; North Missouri 1st, 120; New York, New Haven and Hartford, 181; New York and Erie 2d mort., 108½; New York, West Shore and Buffalo 1st, 80; New York and Harlem, 195; do. 1st coupon, 127½; Nashville and Decatur 1st, 116.

Oregon Short Line, 27; do. 6s, 99⅞, Ohio Central, 11¾; do. inc., 30; Oregon Transcontinental, 85⅛; do. 1st, 95; Oregon Railway and Navigation, 140; Ohio and Mississippi, 34; do. pref., 105½; do. Springfield div. 1st, 118¾; do. consol. S. F., 117; Oregon Improvement, 84; do. 1st, 95⅞; Ohio Southern, 13; do. 1st, 82; do. inc., 32.

Peoria, Decatur and Evansville, 20⅛; do. 1st, 97; do. Evansville div. 1st, 100; Philadelphia and Reading, 54¾; Pullman Palace Car Co., 128½; Panama; 100; Pacific Mail, 41¼; Pittsburgh, Fort Wayne and Chicago, 134½; Pennsylvania Co. 4½s, 96; Pacific of Mo. 1st, 107.

Quicksilver, 8; do. pref., 43¾.

Richmond and Danville, 64; do. deben., 71¼; do. 6s, 98⅛; Richmond, Danville and West Point, 35¼; Rochester and Pittsburgh, 20¾; do. 1st, 106¼; Rensselaer and Saratoga, 144¾; Richmond and Alleghany, 14; do. 1st, 80¼; Rome, Watertown and Ogdensburg 5s, ext., 70.

St. Louis, Alton and Terre Haute, 67; do. pref., 54¼; do. 2d pref., 108½; do. 1st mort., 114; St. Louis and San Francisco, 33; do. pref., 54; do. 1st pref., 9 ; do. gen'l mort., 100⅞; do. 2d, class A, 100; do. C, 98; St. Paul and Duluth, 39; St. Paul, Minneapolis and Manitoba, 129; do. 1st, 108; do. 2d, 109; do. Dakota Ext., 1st, 108; South Carolina, 25½; do. 1st, 105; do. 2d, 99; do. inc., 67; St. Louis, Kansas City and Northern, R. E., 7s, 108; do. Omaha div. 1st, 108½; South Pacific of Mo. 1st, 105½; Southern Pacific of Cal. 1st, 104; St. Louis Iron Mountain and Southern 1st, 115; do. 2d, 108¼; do. 5s, 77; do. Arkansas Br. 1st, 110; do. Cairo, Ark. and Texas 1st, 109⅝; St. Paul and Sioux City 1st, 112.

Texas Central 1st, 107; Texas and Pacific, 39⅛; do. inc., L. G., 66; do. Rio Grande div. 1st, 83¾; Texas and St. Louis, 19; Toledo and Wabash 1st, 107; do. 2d, 99¾; Tennessee 6s, old, 40; do. compromise bonds, 44.

United States 4s, coupon, 119¾; do. reg., 119¼; do. 4½ coupon, 113⅛; do. reg., 113; do. 3s, reg., 103¼; Union Pacific, 96⅞; do. 1st, 115¾; do. S. F., 117; United States Express, 59; Utah Southern Ext. 1st, 101.

Virginia Midland, 30; do. inc., 62; Western Pacific bonds, 111.

Wabash, St. Louis and Pacific, 29½; do. pref., 46⅝; do. St. Louis div. 1st, 101¼; do. gen'l mort. 6s, 80¾; do. Chicago div. 1st, 82; Western Union Telegraph, 83½; do. bonds, 1900, 113; Wells Fargo Express, 124; Winona and St. Peter 1st, 108½.

BOSTON.

Atlantic and Pacific 6s inc., 32; do. blocks, 113⅛; Atchison, Topeka and Santa Fe, 83¼; do. Trust 6s, 101¾; do. 7s, L. G., 112¼; do. 5s, 85; do. 7s, Dutch stamp, 117½; do. 1st, 120.

Boston and Albany, 183; do. 6s, 12c; Boston and Maine, 157; Boston and Providence, 164; Burlington and Missouri River in Neb. 4s, 80¼; do. 6s, non-exempt, 103¼; do. exempt, 113½; Boston and Lowell, 96⅛.

Chicago, Burlington and Quincy, 124¼; do. 4s, 86¾; do. 5s, S. W. div. 80; do, 4s, Denver Ext. 84¼; do. 5s, 102; Connotton Valley, 2½; do. pref., 3¼; Connecticut River R. R., 167¼; Calumet and Hecla Mining Co., 233; Connecticut and Passumpsic Rivers R. R., pref., 88; Chicago and West Michigan, 52¼; do. 5s, 88; Cincinnati, Sandusky and Cleveland, 20; do. 7s, 103; Chicago, Milwaukee and St. Paul, Dubuque div. 7s 103⅜; Cincinnati City 7.30s, 129⅝.

Detroit, Lansing and Northern, 82; do. pref., 113; do. 7s, 118.

Eastern, 43¾; do. 6s, 110¾.

Fitchburg, 125; do. 7s, 123; Flint and Pere Marquette, pref., 99½; Franklin Mining Co., 10¼.

Iowa Falls and Sioux City, 82.

Jackson, Lansing and Saginaw 8s, 1891, 113¼.

Kansas City, St. Joseph and Council Bluffs 7s, 111¾; Kansas City, Fort Scott and Gulf 7s; do. pref., 121; do. 7s, 112; Kansas City, Springfield and Memphis 20; do. 6s, 87½; do. blocks, 100; Kansas City, Lawrence and Southern 6s, 105.

Louisiana and Missouri River R. R., 13½; do. pref., 33; Little Rock and Fort Smith 7s, 91.

Metropolitan Horse R. R., 72½; Mexican Central, 19⅛; do. 7s, 70⅜; do. inc., 19; do. block No. 3, 91; Marquette, Houghton and Ontonagon, 46½; do. pref., 105; Massachusetts Central, 3.

New York and New England, 36⅝; do. 7s, 110¾; do. 6s, 102⅞; New Mexico and Southern Pacific 7s, 112¾; Northern, 112.

Old Colony, 140½; Oregon Short Line 6s, 98¾.

Pewabic Mining Co., 5; Pueblo and Arkansas Valley 7s, 113¾; Pullman Palace Car, 129¾.

Quincy Mining Co., 44¾.

Rutland, pref., 19; do. 5s, 63; do. 6s, 95¼.

Sonora 7s, 103.

Toledo, Cincinnati and St. Louis, 3¾; Toledo, Delphos and Burlington Branch inc., 12.

Union Pacific, 97½; do. 1st, 113; do. 8s, 115½.

Vermont and Canada, 18.

Wisconsin Central, 22¾; Worcester and Nashua, 58.

PHILADELPHIA.

Allegheny Valley 7.30s, 123½; do. income 7s, 42; American Steamship Co. 6s, 105.

Buffalo, New York and Philadelphia, 15; Belvidere Delaware 2d, 103¾; do. 3d, 105½.

Catawissa 7s, 123; Camden and Amboy mort. 6s, 1889, 109; Camden and Atlantic 2d, 113; Central Transp., 35¼; Chesapeake and Delaware Canal 6s, 80. Continental Passenger R. R., 100.

Delaware and Bound Brook, 136; do. 7s, 125¼.

Easton and Amboy 5s, 106.

Germantown Passenger R. R., 67.

Hestonville, Mantua and Fairmount Passenger R. R., 13½; Huntingdon and Broad Top Mt., 14½.

Lehigh Coal and Navigation, 43¾; do. 6s. 1884, 101¾; do. 6s, gold loan, 112¾; do. 6s, Railroad loan, 115⅛; Lehigh Valley, 66⅛; do. 1st mort. 6s, reg., 124½; do. 7s, 133; do. consol. mort. 6s, reg., 125; Little Schuylkill, 60.

Minehill and Schuylkill Haven, 64.

Northern Central, 56⅜; do. 5s, series A, 99¾; do. B, 95¾; Northern Pacific, 51⅛; do.. pref., 88⅛; North Pennsylvania, 66¾; do. gen'l. mort. 7s, reg., 124.

Pennsylvania Canal 6s, 86½; Pennsylvania State 5s, 118½; Pennsylvania R. R., 57⅞; do. allotments, 7⅛; do. consol. mort. 6s, reg., 120; Perkiomen R. R. 6s, 103; People's Passenger R. R. 8; Philadelphia and Reading, 27½; do. pref., 32½; do. deben. 6s, 70; do. scrip, 116¾; do. consol. 5s, 1st series, 75; do. 2d series, 63; do. gen'l. mort. 6s, coupon. 98¼; do. adj. scrip, 90; do gen'l mort. 7s, 103½; do. conv. 7s, 75; do. income 7s, 94½; do. deferred income bonds, 20; Philadelphia and Erie 5s, 103⅛; do. 7s, 113; Philadelphia, Germantown and Norristown, 109; Philadelphia City 6s, 1903, 133; do. 6s, 1896, 129; do. 4s, 1903, 114; do. 4s, 1885, 104; Philadelphia, Wilmington and Baltimore, 4s, 94; Philadelphia and Trenton R. R., 191; Pittsburgh City Compromise 5s, 110; Pittsburgh, Cincinnati and St. Louis 7s, 122½; Pittsburg, Titusville and Buffalo 7s, 97.

Schuylkill Nav., pref., 16; do. 6s, 1907, 9; do. 6s, 1897, 108; Second and Third Streets Passenger R. R., 115; Susquehanna Canal 6s, 65.

Union and Titusville 7s, 98¼; United Companies of New Jersey, 192; do. consol. mort. 6s, 1901, 116; do. gen'l mort. 4s, 96.

Warren and Franklin 7s, 115; West Jersey R. R., 50; West Chester and Philadelphia 7s, 114.

BALTIMORE.

Atlanta and Charlotte Air-line, 68; do. 1st, 108¾.

Baltimore and Ohio, 1st pref., 129½; do. 2d pref., 127; do. 6s, 1885, 103½; Baltimore City 6s, 1890, 115; do. 6s, 1900, 126½; do. 6s, 1886, 107¼; do. 6s, 1893, exempt, 117; do. 5s, 1894, 113¼; do. 5s, 1916, 124; do. 5s, 1900, 120.

Canton Co. stock, 52½; Central Ohio, 51½; do. pref., 54¼; do. 6s, 109½; Charlotte, Columbia and Augusta, 36; do. 1st, 111; Columbia and Greenville 1st, 104¾; do. 2d, 80½.

Georgia Pacific 1st, 86⅞.

Maryland Defense 6s, 103; do. 6s, 1885, 104; do. Relief 6s, 112; Marietta and Cincinnati 1st mort., 132; do. 2d mort., 105⅛; do. 3d mort., 54⅛.

Norfolk Water 8s, 128; North Carolina State consol. 4s, 79; Northern Central, 56⅝; do. 5s, series B, 95⅜; do. 6s, 1885, 104⅝; do. 6s, 1900, 116; do. 6s, 1900, gold, 117½.

Ohio and Mississippi, S. F., 117¾; do. Springfield div. 1st, 118¾; South Side (Va.) 2d, 104.

Pittsburgh and Connellsville 7s, 122½.

Richmond and Danville bonds, 1885, 100¼.

Virginia and Tennessee 2d, 8s, 124¾; Virginia new 3s, 54½; do. consols. 36½; do. consol. coupons, old, 55¾; do. 10.40s, 33⅜; do. Peelers, 37½ do. peeler coupons, 42½; Virginia Midland 1st mort., 111; do. 2d mort., 108; do. 4th mort., 52½; do. 5th mort., 95¾.

Western Maryland, 13⅝; do. 1st unindorsed, 110¾; Wilmington, Columbia and Augusta, 9c; do. 6s, 111; Wilmington and Weldon, 121⅝.

The report of the treasurer of the Wilmington and Northern Railroad Company, which was presented at the annual meeting of the stockholders held at Reading, Penn., on the 7th inst., shows that the gross earnings for the year ending December 31. 1882, were $339,092,66, the operating expenses $264,028.87, taxes $4,656.65, interest on bonds and redemption of branch bonds $12,091.38—leaving as net earnings the sum of $58,315.76. Compared with the previous year the gross earnings show an increase of $14,080.60. It was voted to accept the act of the Legislature authorizing the company to increase its indebtedness $100,000 for the purpose of building branches and sidings. The length of track, including branches, is 85 miles. The company own 16 locomotives and 146 cars of all kinds.

When the Iron Horse was a Colt.

THE Secretary of the National Exposition of Railway Appliances is in receipt of a letter from Mr. David Matthew, the builder and engineer of the first steam-drawn train on the Mohawk and Hudson Railroad, the first trip of which was made August 9, 1831. Mr. Matthew was in charge of the construction of the first three locomotives built in this country, not for experiment, but for definite business purposes.

The first two of these were built for the South Carolina Railroad Company, and their subsequent history is somewhat obscure. The third was the well known "De Witt Clinton," which made the trip from Albany to Schenectady on that memorable 9th of August. The late Thurlow Weed was one of the passengers on this train, there being fourteen in all, filling two coaches. These were ordinary stage-coach bodies, which permitted through the doors and windows a clear view of the passengers within, who, in the old drawing of the train, are seen sitting in pairs on each of the three inside seats, in solemn, stove-pipe-hatted dignity.

With Mr. Matthew's letter is a large card containing, besides explanatory printed matter, two photographs. One is of Mr. Matthew himself, showing a white-bearded bright-eyed, young-faced old man. The other, somewhat faded, represents the first train with its attendants and passengers.

This iron horse, in our fathers' eye a marvelous creature, beneficent, but terrible, was indeed a colt. Small, loose-jointed, scrawny and weak compared with the shining, splendid collossus of the present day, whose swiftness shakes the earth and whose neighings fill the hills with thunder; but it was a genuine and renowned sire of a mighty line of descendants.

It will be interesting indeed to look upon the man whose hand gripped the reins of this historic steed in its first wonderful and victorious race. Mr. Matthew writes:

"You can say I raised the first shelter over engine-men in the world, and they are indebted to me for protection from sun, rain, wind, snow and from the showers of sparks, dust and smoke which come from the smoke-stack."

It is expected that Mr. Matthew will be in attendance at the Exposition, and thousands of railway men and others will be glad to see and talk with him.

National Railway Exposition Items.

A CABLEGRAM from Commissioner Peters, in London, to Secretary Talbott, states that seventeen cases of exhibits for the Railway Exposition were shipped on the 24th ult., by the steamer "Holland." Among these is the "Rocket," George Stephenson's first locomotive.

THE construction of the electric railway at the Exposition building has begun, and is being pushed rapidly forward. The dynamos which are to furnish the electricity have been shipped and will soon be here. It will not be many days before the experts in charge can make experimental tests of its efficiency. This will be the first electric railway ever operated in this country regularly carrying passengers. There will be two trains of light and attractive cars, one of which will be making the circuit of the track, about one-third of a mile, while the other is discharging and receiving its load of passengers. A pretty little station will be built in the northwestern portion of the gallery, with sufficient open space around it to accommodate spectators. The gallery is being strengthened with heavy timbers, and precaution will be taken to guard against the possibility of accident.

THE proper entertainment of the multitude of visitors who will attend the Exposition, and the various conventions of railway men to be held in Chicago during its progress, is being systematically provided for. A number of the leading business men of the city are co-operating heartily with the management to prevent the recurrence of the annoyances which befel visitors at a very large gathering held in Chicago a few years ago. It is proposed to open rooms at a central point in which a register will be kept of hotels, boarding-houses, restaurants, with scales of prices, etc., where visitors can obtain reliable information on all subjects which they would naturally require. The great interest in the Exposition manifested in all sections of the country will insure a very large attendance, and the action above referred to is both timely and necessary.

THE management have sent a competent florist into the Southern States who will ship a number of car loads of tropical and other plants, shrubs, etc., to the Exposition. These will be contributed by Southern railways, and be representative of the sections of country tributary to them. Large shipments of these exhibits will be made from Louisiana, Alabama and Texas, and several other States will be represented.

ALL the large glass tanks around the central fountain have been engaged by railways running into the fishing regions of the North and West to exhibit living specimens of game fish found along their lines. Several more would be filled by other roads if they could be obtained.

THE Knowles Steam Pump Works have removed their salesroom from No. 86 to No. 93 Liberty street—nearly opposite the old store—where extensive alterations and improvements have been made in order to accommodate their largely increasing business, more room and conveniences being required for exhibiting and handling heavy pumping machinery. They propose in future to keep in stock a more varied assortment of their improved steam pumps, air compressors, vacuum pumps, etc., than hitherto. During the past year their manufacturing facilities have been greatly enlarged, especially in building large water works steam pumps.

THE Geo. F. Blake M'f'g Co., having removed on the 1st of May to the large and commodious warerooms, Nos. 95 and 97 Liberty st., will carry a larger stock of Steam Pumps and Pumping Engines than ever before, and it is their intention to keep on hand a full line of all their specialties, which in their former contracted quarters they have been unable to show.

JOHN C. WELCH, 72 Beaver street, New York, and 85 Gracechurch street, London, has sent us his ingenious Table of Circular Desk and Movable Heading. This contrivance, which is convenient in size as well as in form, quotes the lowest and highest prices for each month of last year of leading stocks, staple products, value of money, foreign exchange, etc. It combines compactness, ease of reference and representative facts in such a way that the commercial and financial situation of any time last year can be recalled at a glance.

IN some places in Europe steel bars are used in preference to bells, supplanting them sometimes altogether in church steeples, and producing very pure, distinct and melodious sounds. An English writer even advocates their general use, on the ground that, while in point of sonorousness they are equal to the common bell, in certain other respects they are to be preferred to it. Their weight will be light in comparison with the ponderous objects they are to replace; they will not burden the steeple so much, and consequently will give more scope for architectural design; their winding and hanging up will not be so difficult, dangerous and expensive; they are not liable to crack, as is the case with bells, and are, therefore, adapted for use in any climate; they can also be operated by a simple mechanical contriv ance. They are also much cheaper than bells.

THE Sutro Tunnel Company has increased its bonded debt $36,040, making the total debt of the company $982,962.52, exclusive of interest, which on the 1st of January amounted to $334,181.80.

Written for the AMERICAN RAILROAD JOURNAL.

About Locomotive Runners.

BY WILLIAM S. HUNTINGTON.

THE recent death of the venerable Peter Cooper carries one's mind back to the time when there was scarcely a locomotive engineer on the American continent. We now have at least 1900 in active service in the United States, besides some hundreds who have retired from the profession. The rapid development of the American railway system has brought to the front this most remarkable class of men, and as they serve the public in a position of greater responsibility than any other man living, a little time and space may be profitably be devoted to a consideration of some of the characteristics that enter into the general make-up of those remarkable men, their habits and requirements in the olden time as compared to the present, etc.

In the early days of railroading it was necessary that a locomotive runner should be a thorough mechanic, able to construct and repair the wonderful machine he was in charge of. This was necessary from the fact that none but the builder understood its workings, and he must needs superintend the repairs as well as its performances on the road.

After a time locomotives became more numerous, and repair shops were necessary, which were put in charge of the oldest builders and mechanics. The rapidly increasing demand for runners made it necessary to promote the oldest and most reliable firemen, until it became the established custom to recruit the engineers from the ranks of firemen. The latter, being the assistants of the former, soon come to a thorough knowledge of the machine and its workings, and could handle it on the road as skillfully as he who fashioned it. And for a quarter of a century the supply of firemen was drawn from farms and workshops, and as fast as experts were needed to preside at the throttle, they were selected; those of longest service having the preference, their other qualifications being satisfactory. These qualifications consisted of steady habits, a thorough knowledge of the construction of the machine, its management under all circumstances while on the road, good judgment and a cool head in cases of emergency. It was not necessary for him to be a practical machinist or a thorough scholar. If his engine gave out on the road, he could use all the tools within his reach as skillfully as the master mechanic were he present. If repairs were needed, it was taken to the shop, and if the runner was not needed on the road, he assisted in the repairs, which made him more familiar with the parts, and gave him something of a theoretical knowledge in addition to the practical which he had already gained. In this way he became master of the machine without serving his time as a machinist. He had to pass no soul-harrowing examination on matters not pertaining to his calling. His capacity was measured by the results of his efforts, and when they were satisfactory there was no other consideration. In some instances, in after years, the finest mechanics have left the shops to become runners, and others have been sent out for a time when the "old man" was temporarily short of a runner. In most all instances they proved lamentable failures as engineers, and the best runners then, as well as to-day, are promoted firemen. It is not meant to say that a machinist cannot make a good runner, but he must first have a road experience, and singular as it may appear, a young man who has served in the shop until he is a finished machanic, cannot as readily learn to handle a locomotive skillfully, as one whose experience has been solely on the foot board. Some of our best mechanics cannot be induced to run an engine which was built, re-built or repaired under their supervision on its trial trip, preferring to place it in the hands of a practical runner. To learn to handle a locomotive skillfully is like learning to play the violin. It requires a certain control of the nerves and an acuteness that can only be acquired by early practice, and the man who longs to become a first-class locomotive runner and spends too many of his early manhood days in other employment has lost his opportunity. There are instances of thorough mechanics making skillfull runners, but they are rare. Nor do all firemen make good engineers. There are hundreds of them who can never get above the ordinary duties of firemen, but are highly satisfactory in that capacity. Formerly a wide-awake young man of keen perceptive faculties and good judgment could take charge of a locomotive after firing a year or so, but the present practice on some roads is almost discouraging to the aspirant to the throttle. They must fire for several years; then several years running a yard engine; then a long time on a construction train, and finally on a way freight, after which they are promoted to a through freight; another raise takes them to a local passenger run; and if they servive all this they may possibly reach a through passenger train. Most of these roads require a year or more of service as brakeman before commencing as fireman. And as though all this was not enough, another feather is added in the shape of an examination for color-blindness. The length of time these men must serve in the line of promotion varies on different roads, but the shortest periods would consume a man's best days before he reaches a seat on the coveted engine. And it is not at all probable that these roads are provided with a class of engineers that are superior to those on roads which promote men according to their peculiar fitness for the position, regardless of the time served. It is not only right and proper, but it is a duty that railway officers owe to the public and themselves, to exercise the greatest care in the selection of locomotive runners. But they should always bear in mind that they are *not made—they are born;* and unless nature designed them for engineers, a life time devoted to training will not make them experts. Nature makes the engineer and he is fitted for his duties by training. He is born to the world a rough diamond as it were, and he must be polished by training and experience, but it is by no means necessary to wear him out in the polishing process to make him a model engineer. The locomotive engineer must not only be able to control his machine, but he must have perfect command of *himself* under all circumstances. Otherwise he is as a child in the hands of a giant and is in constant trouble from the most trivial happenings, many of which would have been averted by a control of all his faculties. If he is nervous, fidgetty and uneasy, he labors harder than his engine, and they both fail to perform their duties in a satisfactory manner, and the engine runs him. In order that a locomotive perform satisfactorily, it is necessary for the engineer to be always cool and self-possessed, and "let the engine do the work," while he superintends things.

The writer once knew a very fine mechanic who thought to improve his health by running a locomotive. He was an expert in the locomotive shop and had some road experience. He was given a light passenger run, but somehow he was generally behind time. When he found he was a little behind he would "fret and foam, worry and stew and perspire, and it broke him all up," as the boys had it in the round-house. He would drench the machine with oil, and yet there was always something "getting hot," and there was no end to his trouble and the trouble he gave others; but when in the shop he was at home; cool, calm and collected, and there he was master of the locomotive. The man who ran "opposite" to him left a farm, and after serving as fireman until he had become an expert in making flying switches and "kicking" cars about the yard without smashing things, and gained all the knowledge *necessary* for a skillful runner to know, he was promoted to the throttle. Nature had done its share for him and he was an engineer. He was always on time at "the tick" and there were no outward signs of excitement under any circumstances. He went about his duties as though he were a part of the machine and could not keep doing the right thing at the right time, and all without apparent effort. Train hands, station men, and residents along the line always calculated on his being on time, and never took the chances

of his being a second late. Snow drifts seemed as nothing in his way, and he was indeed a wonder as compared to the shop man. His cool, cheerful presence was refreshing to those around him, and it somehow impressed them with an idea that when he was around nothing could go wrong. He never spoke while on duty unless it was necessary, and then, in a gentle and impressive voice and manner, he crowded a great deal into a very few words. He sometimes gave rather snappish answers to strangers who would persist in asking all sorts of questions, but was usually good natured, civil and friendly, but wanted to be let alone when on duty, and was a fair specimen of the average American locomotive engineer.

They are a distinct type of men; made so by nature and the peculiarities of their calling. They never lose sight of the great responsibility resting on them, or of the danger that besets them on every hand, and "eternal vigilance" on their part is the price of their safety and that of the rest of mankind. In 1880, locomotive runners in the United States carried 291 millions of tons of freight, and 270 millions of passengers; about equal to handling the entire population five times. And, according to statistics, the safest place for us mortals is aboard a passenger train. True, we have railway slaughters, but they are rarely the fault of the engineer; and on how many occasions have they laid down their lives to save the hundreds behind them, who were unconscious of danger? Strong, robust, honest, faithful to his trust, we place our lives in his hands, trusting to his skill, and there is no manlier man than the locomotive runner.

Constitution Club.

WITHIN a short time there has been formed in the city of New York, a new Club bearing the above name. We understand that no man is eligible for membership who is at present a National, State or Municipal officeholder, and whenever one of their own number accepts an office as above, he ceases to be an active member. While we are not disposed to question the right of any association to choose its own members, still we cannot help deprecating this wholesale ostracising of a class of men many of whom are ornaments to the age in which they live. Still, for the purpose of this Club, it may be the only safe way. For the benefit of our readers we print the following tract, which is being freely distributed by some members of this Club, a reading of which will better convey the spirit and aims of its founders.

THE AVERAGE CITIZEN.

Necessity for Organization.

THE AGGRESSIONS OF CORPORATE WEALTH ENDANGERING LEGITIMATE PROPERTY RIGHTS.

A FEW UNDISPUTED FACTS.

THE spirit of association has in all ages induced men to join together for either pleasure or protection, and the *Average Citizen* has from the earliest period played an important part in regulating the affairs of society. The merchants' associations or *guilds* of the middle ages have been called the bulwark of liberty because they withstood alike the assaults of barbarism and despotism.

The *frith or peace guilds* were a feature of English life from the seventh to the tenth century, and in the eleventh and twelfth centuries they extended over the continent; one of the most important was founded at Roeskild, under King Canute, for the suppression of the piracy of the vikings. Others, as in Schleswig, Artois, Fleisburg, etc., joined "*for the protection of right and the preservation of liberty, the hindering of violence and maintaining of peace by all means that law and custom allowed, even against kings.*"

The Guilds became of such importance that their laws grew to be that of the commune or city, and to them we are largely indebted for many of the principles of the common law which have withstood both the open assaults of power, the covert stabs of *Codifiers*, and are still the bulwark of individual rights as against corporate aggression.

Some may think that there is no longer any need for citizens to associate for the protection of their own and others' rights. We have not, to be sure, the robber barons of the middle ages who took toll with the strong hand from the caravans which passed through their defiles, but the ingenuity of the nineteenth century has largely monopolized the forces of the age and devised a system by which the production and commerce of a continent has been directed into a few narrow channels, not to say defiles, and, through the device of rendering a public service and under the forms of law, is tolled at will by our brainy barons upon the same principle the barons of the strong hand in the middle ages took toll—*what the traffic will bear.*

When and where has the world ever seen such aggregation of wealth as have been suddenly accumulated by the carrier taxing the producer and merchant and consumer?

And this result is not the worst feature; the means to the end are the most to be deprecated. The corruption of our elections, legislatures and courts—the undermining of the very foundations upon which our forefathers based our free institution—the spectacle exhibited to the young, of chicanery and fraud conferring the highest prizes of society upon its most unscrupulous and unworthy members. These are features of our modern life which suggest in the strongest manner a future, if not a present, for our country, "*Where wealth accumulates and men decay.*"

If any are disposed to question the truth of this picture let them consider a few undisputed facts. It is not disputed

That Gould, Vanderbilt, Huntington, Stanford, Sage, Field, etc., twenty years ago were comparatively poor men, and to-day these five are worth probably $500,000,000; and, through the corporations they control, wield the power of $3,000,000,000.

That they control absolutely the legislatures of a majority of the States in the Union; make and unmake Governors, United States Senators and Congressmen, and under the forms of popular government are practical dictators of the governmental policy of the United States.

That within twenty years two hundred millions of acres of the public lands have been given to corporations, equal to about four acres for every man, woman and child in the United States.

That this wealth and power have been acquired largely through bribery and corruption. Mr. Gould testified in 1873 that he contributed money to control legislation in four States, and it was proven that the Erie road, in a single year under his management, disbursed more than $1,000,000 for this purpose. His interference with the administration of our courts of justice is illustrated by his telegraphing United States Senator Plumb, asking him to support Stanley Mathews for the United States Supreme Court. And the striking spectacle was presented of Whitelaw Reid, editor of one of the leading Republican journals of the country, and Henry Watterson, editor of one of the leading Democratic journals of the country, lobbying on the floor of the United States Senate to secure Mr. Matthews' confirmation as Judge of the Supreme Court of the United States.

That because Senator Thurman was active in compelling the Pacific railroads, in which Mr. Gould was interested, to fulfil their contracts with the Government, that honest man and able statesman could not return to the United States Senate.

That E. D. Worcester, Treasurer of the New York Central Railroad, testified before the late Constitutional Convention of the State of New York that that road paid $205,000 one year and $60,000 another to obtain legislation, and that *it was obtained.*

That in the United States senatorial contest last year in the State of New York, a member of the Legislature stated that he had been given $2,000 to vote for a railroad candidate for the United States Senate; that he had given the money to the Speaker, and asked for an investigation. An investigation was

ordered and a State Senator and two lobbyists were indicted; but they have not been tried, and it is stated that corporation influence will prevent their trial, or if tried, secure their acquittal.

That in 1877 the railroad riots in Pittsburgh destroyed a large amount of property. The railroads refused to indemnify shippers, but endeavored to make the people of the State liable to the railroads. They tried to buy a bill through the Legislature saddling several millions of dollars upon the public. Their usual method of bribery was employed, but was detected, and E. J. Petroff, a member of the Legislature, with several accomplices, were tried and found guilty: but here political influence was brought to bear, United States Senator Don Cameron leaving his seat in the Senate and going home to look after things, *and they were pardoned.*

That last winter the railroads of New Jersey united in an effort to secure the entire water front of Jersey City under the specious guise of confirming the boundaries of a map. This infamous bill was such a flagrant disregard of public rights that the Governor, although elected by railroad votes, vetoed it. The Senate again passed it over the veto, but the Assembly hesitated, and bribery, the usual monopoly weapon in such cases, was resorted to. An investigation was ordered, and the committee reported that the bribery was fully proven, and that John J. Cromer was the man who did it. He has not yet been tried, and it remains to be seen whether Jersey justice is equal to the task of punishing a corporation briber.

That in March last two members of the Ohio Legislature were arrested for bribing others in the interest of a railroad company.

That the Congressional investigation of the Credit Mobilier swindle showed that $47,261,000 profit was made by a syndicate of Congressmen and other public men; and it is a well known fact that many of our public men have become very wealthy without any visible means of doing so.

That Congress is packed with corporation lawyers and other representatives of monopoly interests; measures in the interest of the people are retarded, smothered or throttled, while those in the interest of corporations are consummated without the slightest difficulty.

That public sentiment has for several years demanded the enactment of an adequate law for the regulation of inter-State commerce, but it has been postponed and throttled without the slightest consideration.

That the last Congress not only refused to restore to the public domain the lands which had been forfeited by the Northern Pacific Railroad, but on motion of Congressman Reed, of Maine, gag law was enforced, and Congressman Caswell, of Wisconsin, *tried to prevent the vote going on record.*

That a large portion of the public travel on free passes at the expense of the rest of the community, and a free pass issued by the New York Central Railroad is in the possession of the Anti-Monopoly League, which specifies that it was issued *on account of the Supreme Court.*

That a committee of the New York Legislature, Hon. A. B Hepburn chairman, after investigating the management of railroads in this State, used the following language: "Abuses" in railroad management exist "so glaring in their proportions as to savor of fiction rather than actual history."

That to perpetuate these abuses the perpetrators thereof are now seeking to control the thought of the nation. Leading journals are purchased with illgotten gains, and the ablest editors in the country are engaged to preach "peace on earth and good will to men" in one column, while misleading innocent investors and villifying patriotic citizens in the others.

In view of these facts is it not time that citizens were again associating in guilds to uphold right and put down wrong; to sustain the Constitution and the old laws which were adopted to secure freedom and equality for all men?

Never has there been a time during the past thousand years when there was more need of the services of the average citizen than at present. Financial freebooters sailing under the flag of law, have pillaged the people until they are almost ready to take up arms, and when that kind of a fight is once begun, who can tell where it will stop? The average citizen is the true conservator of property rights; he resists alike the assaults of the idle and vicious, and the aggressions of the unscrupulous and powerful. It is from the latter that the worst is to be feared at the present time, and our guilds must arrest the financial freebooters who are preying upon our industries and threatening our free institutions. Let us be citizens in the truest sense, and while diligent in business not forget our duties to our country—show that we are

"Men who their duties know,
But know their rights, and knowing dare maintain."

Recent Legal Decisions.

In Gribble vs. *The Pioneer-Press* Company, in the United States Circuit Court, district of Minnesota, Judge Nelson remanded a cause which had been removed to the federal court upon discovering on the argument of a plea to the jurisdiction that the plea was not removable. In the opinion he said: "It is without doubt the right and duty of the Court to remand a cause removed from a State court if it ascertains in any way that it was not removable under the law. This Court cannot be obliged to proceed with the trial of a cause with the knowledge that it is in fact within its jurisdiction, and either party may at any moment, by raising the question of jurisdiction on the record, put an end to the proceedings."

APPROPRIATION OF PAYMENTS.

There was sent to a superintendent of a railway company $5,000 to pay the laborers on the road, but the superintendent applied the money to the arrears of salary due him. The company sued him for this amount as money had and received to its use, and was beaten. It carried the case (Detroit, H. and S. W. Railroad Company vs. Smith) to the Supreme Court of Michigan, where the judgment was reversed. Judge Cooley, in the opinion, said: "Payment implies a voluntary act of the debtor looking to the satisfaction in whole or in part of the demand against him, but in this case there was no such act whatever. What was done by the defendant was in the face of the plaintiffs' instructions. A creditor cannot lawfully pay himself with the debtor's money without his consent, either expressed or implied, and when the debtor delivers money to the creditor to be applied to a certain purpose, the creditor's control is limited to the purpose declared. Such is the case here."

RAILROAD NEGLIGENCE AND PARENT'S NEGLIGENCE.

It was shown that a railroad company operated its train at a street crossing negligently, whereby a boy five or six years old, who had been sent across the track by his mother in company with an older boy on an errand, was injured. In an action for damages the plaintiff recovered, and the case—Galveston, etc., Railroad Company vs. Moore—was carried to the Supreme Court of Texas. The judgment was affirmed. Judge Stayton in the opinion said: "As to whether the negligence of a parent is to be imputed to an infant the opinions of the courts distinguished for their learning were widely at variance, and they are, perhaps, irreconcilable. The leading case in America for the affirmative in New York is Hartfield vs. Roper, 21 Wandell, 615, which has in the main been followed in other States. This line of discussion applies the rule whether the parent was present or not at the accident. The case of Robinson vs. Cone, 22 Vermont, 213, is the exponent of the negative of the proposition, and courts of other States have followed it. The English courts sustain Waite vs. R. R. Co., El., Bl. and El., 719, which limits the operation of the rule to cases where the parent or custodian is actually present and directing or controlling the action of the child; and to us this would seem to be the utmost limit to which the rule, in reason and upon sound principle, could be extended."

TRAMWAY DEPARTMENT.

[This department of the AMERICAN RAILROAD JOURNAL is devoted to the interests of Street Railways; and communications, suggestions and items of information relative to their organization, management and appliances are solicited by the editors. All communications should be accompanied by the name and address of the writer. The English nomenclature of "Tramway" is adopted in this department as being of greater convenience and more specific in its meaning than "street railway," though in allusion to individual organizations we shall preserve their corporate titles. It is our hope to nationalize the term Tramway, which is now generally used in every English speaking territory with the exception of the United States.]

THE opening of the East River Bridge is the coming event in the sister cities of New York and Brooklyn, and throughout the country will be regarded with the satisfaction and pride justly felt upon the conclusion of a magnificent undertaking, one of the greatest achievements of mechanical skill. To the readers of the AMERICAN RAILROAD JOURNAL, a perhaps more interesting occasion in the same connection, will be the starting of the cable car system on the great bridge, an event announced for about the middle of June. The success of the system in Chicago and San Francisco gives the assurance of its elegibility for use between New York and Brooklyn, especially as place is being found in the arrangements in progress, for the improvements invented by Colonel PAYNE, which make the system a practicable and effective substitute for the use of horses. The operation of the cable on the bridge will be viewed with the greatest possible interest by the street car companies of the two cities to be brought into rapid communication by its means. The use of a comparatively inexpensive substitute for horse-flesh, and one otherwise as efficient, would restore to the street car companies any advantage possibly lost to them by the completion of the elevated railroads, and would certainly insure to the public improved service in both the air and on *terra firma*. Possibly some readers are old enough to recall that among the many humorous productions having the introduction of the locomotive among modern appliances of transport as their subject, was one, published in London, which represented the noble horse reduced to indigence and ballad-singing for a living. Gaunt, wretched, his occupation gone, the unfortunate animal is represented as singing plaintive verses as the means of his support, lamenting the generous oats and careful grooming of his useful days. As the event of the general use of locomotives proved, the number and value of the horse increased in consequence, so we may be assured that the general employment of the cable in provision for street travel would not diminish the value of this noble quadruped in human service, but probably increase it. Meanwhile street car companies are interested in finding a less expensive means of locomotion than that effected by the muscles of the horse, and will, we are quite sure, appreciate the importance given in the department opened with these remarks, to the subject of traction by cable. The matter describing the inventions of Mr. WORCESTER HADDOCK, of Cincinnati, will be found both interesting and valuable.

THAT contemptible being, the surreptitious smoker on horse cars, should be put off without mercy. "No smoking" is an inscription familiar enough on the showy exterior of these indispensable vehicles; but what a "fib" it is, perhaps in most instances. While the weather is still cool, and the forward door of the car is kept closed, the presence of the smoker on the platform with the driver may be tolerated, but that of the sly puffer at the back of the car is an outrage on his fellow-travelers. Every reader knows this fellow, who manages to keep his "three-for-a-dime" alight by occasional whiffs, over miles of travel. Obedient to the conductor's injunction he holds his lighted cigar in his hand until that functionary has business within, and then proceeds to distress his fellow-passengers by keeping alive the consumption of his vile weed. His detection in this operation is as easy a matter as possible, and he should be compelled to leave the car for the comfort of those who have paid for a ride exempt from such a nuisance as he creates. The conductor understands what he is doing well enough, and his amiable regard for peace should not be allowed to interfere with the right of passengers to breathe air unpolluted with the vile smoke of a half-dead cigar.

ATTENTION is called to the propriety of improved ventilation in certain horse cars of antiquated construction still run on the Eighth avenue road of this city. This is a matter of great importance to the public health and comfort, especially as the warm season is about to begin. We submit that, for the general good, existing means of ventilation in said antiquated vehicles should be utilized to the utmost and supplemented with improvements in cases, if any, where these are necessary. It would certainly be cheaper to improve the ventilation of old cars than to build new ones to replace those of venerable years, which seem to be otherwise unobjectionable than as either wanting the means of providing passengers with wholesome air to breathe, or, by the oversight of persons sending them out, put on the street in a condition which does not admit of such provision being utilized.

THE process of time is developing considerable opposition to a scheme which, if carried out, would, it is alleged, damage incalculably one of the most beautiful and elegant portions of our sister city, Brooklyn. We refer to a project to construct and operate a cable railroad along Montague street from Wall street ferry to the City Hall. The consummation of this scheme would infallibly transform Brooklyn Heights from the site of homes of elegant privacy to a busy scene of merchandise. This transformation is deprecated by many persons who claim that while Brooklyn Heights as at present occupied is unapproachably eligible for elegant private residences, the expansion of commercial Brooklyn is equally eligible in other directions.

JOHN SMITH writes us that the most exasperating thing in his life is the getting a train on the "L" road a moment after commutation time. Everybody on board, he feels, is five cents ahead of him, and he has to hold on to the straps for half an hour while most of his fellow-passengers are comfortably seated, although he has paid double the rate for his accommodation that they have.

Proposed Broadway Arcade.

THE Broadway (New York) Arcade Railroad bill has passed the Assembly. Its projectors hope to get it through the Senate and approved by the Governor. Should they succeed they will begin the construction of the road in the fall. By their charter granted in 1881 they possess the right to lay a four-track railroad under Broadway. The present bill adds the right of laying sub-sidewalks and vaults for the reception of water, gas, steam, sewer and electrical pipes. Without these sidewalks the tunnel would be dark, ill-ventilated, and much less available for way travel. Its line is from the the Battery up Broadway to Twenty-third street, where it divides into two branches. One follows Broadway and the other follows Madison avenue, and they meet again at High Bridge. It is proposed to entirely remove the roadway and sidewalks of Broadway, and to substitute an artifi-

cial roadway supported on massive iron girders by frequent columns. The level of the roadway will be the same as the present level of Broadway. The sub-sidewalks will be immediately beneath the present sidewalks, but will be wider, as they will extend to the walls of the buildings. The present area openings will be left open for light and ventilation, and the upper sidewalk will be set with bulls-eyes. The lower roadway will be occupied by four tracks, of which the outer adjacent to the sidewalks, will be for way travel, and the inner for express travel. The tracks will have the ordinary gauge. Beneath the sidewalks will be large vaults, where all the various street pipes can be placed. Mr. Melville C. Smith, the projector, says there is no lack of money to carry on the enterprise. It will cost about $2,000,000 a mile. The London underground roads, which are similar, pay interest on $5,000,000 a mile. The work of removing the present roadway will not interrupt travel, as bridges will be so used as to obviate any disturbance. When finished the Arcade will not be a tunnel, but a regular street, well lighted and well ventilated. Stairways will descend to it from each street corner.

New York Elevated Steam Railways.

THE only railways of this class in operation in the State are the New York Elevated and the Metropolitan Elevated, both of which are leased to and operated by the Manhattan Railway Company. As described by the State Engineer and Surveyor in his annual report to the Legislature for the fiscal year ending September 30, 1882, these roads are virtually a succession of iron truss bridges resting on vertical columns of sufficient height to clear the streets. The number of miles of main line in operation at the close of the year named was 31.70; miles of branches, 0.71—total miles of single track on main line and branches, 32.41; miles of additional track, 36.60; miles of sidings, 10.66—total miles of track, 79.67. The equipment consisted of 219 locomotive engines, 610 first class passenger cars, and 20 cars for service. The number of miles run by trains during the year was 5,917,051; the number of passengers transported, 86,361,092; the average amount received per passenger, 6.86 cents, and the average cost of transportation per passenger 4.25 cents. The receipts during the year were: from passengers, $5,922,688.12; from mails, $5,000; from other sources, $15,945.29—total, $5,973,633.41. The expenditures during the same time were: for cost of transportation, $3,668,370.48; for interest, $1,364,080; for dividends, $589,942.50; for rental of leased lines, $20,000; for other items, $15,108.64—total, $5,657,501.62. The amount of capital stock issued was $26,000,000 (including $13,000,000 issued by the Manhattan Railway Company). The funded debt was $21,318,000, and the unfunded debt $1,647,639.35. The total cost of road and equipment was $34,882,790. The percentage of net earnings to cost of road and equipment was 6.61, and the percentage of total expenses to gross earnings 61.10. The average cost per mile for transportation expenses was $113,186.36; for maintaining road and real estate, $10,223.95; for operating road, $87,026.05; and for repairs of machinery and cars, $15,936.36. Average number of persons employed, 3,766; average number to each mile of road, 116.

Traction by Cable Across the East River Bridge.

THE reader is probably aware that the East River Bridge railroad will not be opened when the rest of the structure is, because experiments are to be made with the rope-traction power in order that all risk may be avoided. There are to be twenty-four cars, of which the most of them are already finished. They are light, airy, and comfortable. The cars are similar to those in use on the Sixth avenue elevated road, New York. There is so much glass about them that a superior system of brakes would be needed to prevent the bumping of the cars together, even if the sharp grades did not make them necessary. The grade is about one foot in one hundred, and the inertia of the cars after passing the centre of the bridge either way, would cause them to acquire an impetus, if unchecked, that would be disastrous before reaching the station. Hence three kinds of brakes are used, including the Westinghouse brake. In the event of a mishap to any one of the brakes, either of the others will be ample to control a car.

The cars will start from Brooklyn, and return by an opposite track, so that one track will be exclusively for New York business and the other for Brooklyn business. The system, which is called the circulating system, has been perfected regardless of expense. Its cost exceeds $350,000. The endless cable is operated by a 400-horse power engine near Prospect street, Brooklyn, and is 11,700 feet long. There will be an extra cable alongside, to be put into use in case of an emergency. The cars will be attached by a clamp made of two pulleys facing each other horizontally, and under the control of a lever which, moved in one direction, will release the grip of the clamp, and, in another, will tighten it. The tighter the clamp the swifter will be the speed of the cars. When the clamp is released the same movement will apply a brake to the wheels.

It is expected that four cars will be run over at a time, carrying, at a pinch, as many as four hundred passengers. The first car of the train will be attached to the cable. The cars will make through trips, and will not stop for way passengers. They will be switched from one track to another at the termini. Passengers will pass out by a stairway to be used solely as an exit. The distance to be traversed by the cars is a mile, and at the rate of speed which will be adopted, it is expected that the trip will be made in about four minutes and a half or five minutes. In the busy hours, the speed may be greater. It is calculated, however, that the trip will generally require five minutes.

Traction Rope Railways.

BY D. J. MILLER.

OF all devices yet introduced for the propulsion of street cars, the cable system seems most efficient and open to the fewest objections. In this we find the true principle of traction which is not to be found in any other method of street car locomotion. Although it has proved perfectly practicable, railway companies seem very dilatory in its adoption, as now nearly ten years have elapsed since the starting of the first cable street railway and but very few roads are yet in operation. As railway officials become acquainted with its superiority over the old methods and also of the increased traffic and percentage to be gained by the use of the cable system, no doubt the subject will receive closer investigation, and this may lead to its more general adoption.

A cable road can not fail to be a practical and financial success if mechanically constructed, but if poorly built the outlay for continual repairs may amount to more than the expense of running the cars by animal power. The cost of a well made road need be no more than for an inferior one, and may be less by receiving close attention from a skillful manager. The advantage of the cable system over that of animal traction is generally conceded, but objections are made to the original cost.

There is now a tendency on the part of railway companies to experiment on various constructions in hopes of discovering some plan by which the expense of construction may be reduced, and also to avoid patented improvements. This is to be regretted, as much time and money could be saved if willing to profit by others' experience instead of disregarding the same, and every failure to produce good results after large expenditure is apt to induce an aversion to the system, when if properly arranged and managed it would afford complete satisfaction.

The engineering required in planning and constructing a cable railway is as varied perhaps as in any work of modern times. Designing and arranging driving machinery and appliances along

the route for operating the cable, construction of iron work of which the road is almost entirely composed, arrangement of vaults in the streets for large sheaves, curves and shunting devices, street lines and street grades, and drainage for tunnel, together with many other details, probably presents as much variety of engineering work as is usually contained in any one enterprise, and this work should be planned and carried out on scientific principles. As the cable is one of the largest items of expense in operating a road, a short description of the same may be of interest.

The cable used on the Chicago roads has a diameter of one and one-fourth (1¼) inches, and the breaking strain is twenty-seven (27) tons. This rope is made of Swedish iron and is composed of six strands, each strand having nineteen wires, of which twelve are on the outside and the remaining seven on the inside of the strand. (The actual center of the cable is a small hempen rope.) As there are six strands, each having seven wires which are never exposed to wear, it will be seen that after those on the surface are badly worn and broken, there are yet forty-two (42) uninjured wires, and these alone will stand a strain of nearly ten tons, which is sufficient strength for the work, consequently a cable can be used for several months after the outside wires are all broken, but when in this condition it is a difficult matter to keep the spliced parts from separating unless the strands were well interwoven when the splice was first made.

The life of the traction rope depends very much on the arrangement of guiding and carrying sheaves, and when a rope is used on a straight line of road it will wear from six to eight times longer (speed considered) than when used on curves. The cable is bent to meet the small guiding sheaves when passing around curves, and although but a slight deflection is made, constant use soon breaks the wires, and this materially shortens its term of usefulness, but when employed on a straight line the surface wires will be all worn before the rope must be discarded. If a road is so constructed that the cable is actually worn out before it need be replaced then the greatest service is secured, but when the wires are merely broken and not worn, it is very evident that the construction is faulty. There is one first-class cable railway now in operation on which the cables cost at least twelve hundred ($1,200) dollars per year for each mile of single track, and if an arrangement such as we have recently seen had been used, having many sharp bends in the cables, the ropes would in all probability last not more than one-sixth of the time they now do, and the expense for cables reach a sum of about seven thousand ($7,000) dollars per mile, when it should not much exceed one thousand ($1,000) dollars.

The cost of this or that system is the question most discussed at the present time by railway men who are interested in the subject, and the cost should not be considered of paramount importance. Annual repairs and operating expenses, also durability of the construction, should receive as much study and attention as this item of first cost, as on these depend the percentage to be obtained from the investment. A large sum invested and paying a heavy percentage would give more satisfaction than a small amount at a small percentage, and one of the arguments in favor of the cable system is the heavy percentage realized from the outlay. It would be unwise to reduce the cost of construction if by so doing the operating expenses were to be increased.

Cable roads are yet in their infancy and it is reasonable to believe that a great many improvements will be made in the future, and also that the time is not far distant when street railway companies will find it to their interest to avail themselves of the many benefits accruing from the use of the cable system.

New York State Surface Street Railways.

The State Engineer and Surveyor, in his annual report on the Railroads of New York for the fiscal year ending September 30, 1882, which was transmitted to the Legislature on the 18th ult., says that the total miles of road constructed at that date was 460.70; and the miles of additional track, including sidings, 296.71—making the total miles of track in operation 757.41. The number of horses and mules was 20,281; dummy cars, with engines, 40; passenger cars, 3,903; freight cars, 34. The number of passengers transported during the year was 277,171,345; tons of freight, 12,146. The average amount received per passenger was 5.119 cents; average cost of transportation, 4 cents. The total cost of road was $35,859,521.72, and the total cost of equipment $6,684,222.88. The amount of capital stock issued was $25,009,448.94; the funded debt, $17,605,136.61, and the unfunded debt $1,416,957.09. The receipts during the year were: from passengers, $14,189,171.48; from freight, $6,901.09; from other sources, $568,044.36—total, $14,764,116.93. The expenditures during the same time were: for cost of transportation, $11,086,242.11; for interest, $1,139,434.33; for dividends, $2,153,126.57; for other items, $66,644.45—total, $14,445,447.46. The average cost per mile for transportation expenses was $24,063,90; the average cost per mile for operating and repairs, $21,619.46; and the average cost per mile for maintaining road $2,444.44. The percentage of expenses to gross earnings was 75.09; and the percentage of net earnings on cost of road and equipment, 8.64.

New Improvements in Cable Street Railways.

The National Cable Power Company of Cincinnati, Ohio, is organized under the laws of the State, and is the owner of Worcester Haddock's patents for the United States. It was organized with E. M. Johnson, president, and Judge George Hoadly, secretary and treasurer. Mr. Worcester Haddock, of Cincinnati, is one of the directors.

That one of Mr. Haddock's inventions which relates to the class of street railroads in which an underground cable is employed for propelling the cars possesses advantages, among which may be mentioned the following: The box in which the cable travels, and the supports for the stringers being entirely of metal, there is no decay of material. The box, being cast or otherwise made in sections, does not require a large amount of excavation to place it in position. This is a very important feature in the construction of this class of railways, as by the Haddock mode of construction an ordinary street railway can be changed into a cable railway without interfering with the travel to any considerable extent, as the only excavating necessary is between the tracks, and just sufficient to contain one section of the box, which may be put in position and bolted to the sections already in position. This is not the case with cable roads as heretofore made, as the street must be torn up or blockaded on either side of the track in order to place the box or tube in position, and this entirely stops all the travel until the road is complete.

It often becomes necessary to examine the interior of the box at various points; and where Mr. Haddock's invention is used any part of the interior of the box may be examined without interfering with the street. The invention is applicable to various railways other than those before mentioned; as, for example, it may be applied to inclined planes and elevated roads. In the latter instance the box may easily be supported by the trestle-work, and will be found as thoroughly operative as though it were in the ground. By the employment of this important invention it is practicable to construct any number of cross-tracks, and the cable in one track will not interfere with the cable in the cross-track. This result has not been heretofore accomplished, and is a feature of great importance, as at the present day, in cities of any considerable size, the street car tracks run in many directions, and in their course cross many other tracks, often at right angles and often at an acute angle. The mode in which the several parts at and near the point where the opening

of one track crosses the opening of another track is constructed enables the constructor to make a firm, strong track clear up to the said opening, said track being fully supported by convenient bearings. The aforesaid construction admits of the said portions being readily put together in the first instance, and readily removed and replaced and renewed in case of repair. Shoes or pieces may be cast solid with the box, or be made separate and bolted on. The various other parts attached to the sections of the box or tube may be separate and bolted fast; but the inventor prefers, for obvious reasons, to cast or form all in one piece with their respective section of the tube.

The invention, of which some of the advantages have been mentioned, is protected by letters patent No. 275,378, and the reader is referred to the specification for a detailed description of it.

Instead of the Bell-Punch.

M. W. MAHAR, of Soldiers' Home, O., has invented a fare-box to take the place of the bell-punch. The box is given to the conductor by the clerk at the office, and is carried by a strap suspended from the shoulders. It is presented to the passengers, each one of whom drops his or her fare in its mouth. The fare drops down into a glass-sided compartment of the contrivance, when the conductor presses a lever, the operation of which drops the fare into a box from which it cannot be removed without unscrewing the top from the device. If the contrivance be turned upside down a loose stop descends upon the inner end of a flat tube and prevents the egress of the contents. The top of the fare box is fastened with a seal to prevent all tampering with it. When the box is returned by the conductor the proper person at headquarters breaks the seal and unscrews the top. The contents are then easily removable from the fare-box.

TRAMWAY NOTES.

THE Monumental City Railway, of Baltimore, which was sold by auction on the 8th inst. for $100,000 to Robert D. Morrison for a syndicate of Philadelphia and Baltimore capitalists, has about three and a half miles of double track inside the city and three and a half miles single track in the county, 14 cars, 66 horses, harness, etc., two dummy engines, stables and offices at Highlandtown, car sheds, etc. The purchasers, it is stated, will put money into the enterprise, get new cars, etc., and run the road on business principles. It is claimed that it will be made a first-class road.

THE North Chicago City Railway has 33 miles of track, 150 box cars, 100 open cars, 1,312 horses driven by 154 drivers. They averaged 158 conductors. There are 7 stable foremen, 14 watchmen, 120 grooms, 15 blacksmiths, 14 car builders, 9 painters, 2 harness makers, 20 trackmen, 7 teamsters, and 5 bridgemen—a total of 525. It carried 16,338,594 passengers during the year 1882. The total number of miles run by the cars during the same period was 2,960,867, being an average of 7,848 miles daily. The number of round trips made was 430,939.

A MAP has been filed in the Register's Office, Brooklyn, N. Y., of the route of the newly formed Prospect Park and Seaside Railroad Company. The route is from Fulton Ferry along the line of the Bridge and its Brooklyn approach to Prospect street, close by the Bridge entrance, thence in the line of the proposed extension of Flatbush avenue to Fulton street, and in Flatbush avenue, Butler street and New York avenue to the city line, and thence through the towns of Flatbush and Flatlands to the seaside.

A CORRESPONDENT writes that the best which can be said for advertising in street cars is, that it gives the public wholesome reading about compounds to expedite the family washing and to regulate the action of the liver, in large type and under conditions favorable to reflection. This, he maintains, is indubitably a good thing now that the doctors so generally forbid reading the newspaper while the car is in motion, and is a decided improvement upon people sitting and ill-naturedly staring at one another.

THE new Seventh Avenue Street Railroad, a branch of the Atlantic Avenue Line, was opened on the 30th ult. The cars run from Seventh avenue and Twentieth street, in Seventh, Flatbush, Fifth and Atlantic avenues, Boerum place, and Fulton, Adams and Front streets, to Fulton ferry, Brooklyn. The distinctive color of the cars is Portland amber. The stables of the line are at Twentieth street and Seventh avenue. The line is equipped with thirteen close and thirteen open cars.

THE obnoxious bob-tail car has at length been suppressed—or is about to be—on the lines of the Brooklyn City Railroad Company, and in future two-horse cars, with conductors, are to take their place. It is understood other companies in Brooklyn will follow the example, as the popular prejudice against the bob-tail in that city is very strong. But as for that, the popular prejudice against them is very strong everywhere.

AT a meeting of the sub-committee on street railways of Alleghany Councils on the 30th ult., a communication was received from the Pleasant Valley Street Car Company, stating that they would commence laying tracks on Charles street in a few days. The Union Line was granted the right to lay tracks on Spruce street.

THE first car of the Citizens Passenger Railway reached the borough of Sharpsburg on the 7th inst. The line now extends from Sixth street, Pittsburgh, out Penn avenue and Butler street, over Etna bridge to the furthest end of Sharpsburg. This is the longest of the Pittsburgh lines.

THE entire capital stock of $5,000,000 of the proposed Chicago Elevated Railway has been subscribed for by three men, viz: E. H. Spooner, $2,000,000; Wm. S. Pell, $2,000,000; R. M. Bacon, $1,000,000.

THE Mound City, Illinois, Railway is doing a good business, and a double team has been substituted for the single one that formerly hauled the passenger car.

THE Montreal City Passenger Railway Company have ordered the rule prohibiting smoking in any part of their cars to be rigidly enforced.

BROOKLYN is said to possess the best street car service in the United States.

A STREET car line, with cars pulled by goats, is to be established between Butte and Walkerville, Montana.

BOWERS, DURE & Co. have finished two new cars for the Wilmington City Passenger Railway Company.

A NEW street railway is being formed in Quebec to run between Lower Town and St. Valier toll-gate.

L. A. SENECAL has been elected a director of the Montreal City Passenger Railway Company.

The Hatchet Club.

"TALKING about wind," continued Eli Perkins, before the New York Hatchet Club on Washington's birthday—"talking about wind, I saw an ordinary quiet zephyr out in Kansas blow an iron bedstead seventy-eight miles, and the next day it came back after the sheets and pillows." (Sensation).

"But that is nothing, gentlemen, to a wind I ran against up in Minnesota. You see it had been blowing hard enough to blow the ears off of mules and the horns off of cattle for several days. (hear, hear). But that day I started from St. Paul to Minneapolis behind a span of mules. The wind struck the off mule—a zephyr from towards Duluth struck him when he had his mouth open and turned that mule completely wrong side out. (Sensation).

NEW INVENTIONS.

TO INVENTORS AND PATENTEES.

THIS department is devoted to the notice, consideration and description of new and valuable inventions applicable to Railroads, Steam Navigation, Machinery, Manufactures, Mining and Tramways. New patents of this description appearing in the weekly Official Gazette of the Patent Office are duly noticed in our columns, and full descriptions of those most useful and important are published *free of charge.*

☞ Inventors, Patentees, and the holders of Patents are requested to forward us their claims and specifications, with description of their inventions for our examination with a view to their publication in this department. Descriptive cuts, diagrams, and illustrations of the same are also desired.

☞ In selecting inventions for full description in this department, the editor will be guided solely by their importance and value, and their interest to the readers of the AMERICAN RAILROAD JOURNAL.

List of Patents for Inventions Relating to Railways, Tramways, Machinery, Etc.

BEARING DATE OF APRIL 10, 1883.

275,357. Dumping-Car: Nathan W. Condict, Jr., Jersey City, N. J. Filed Nov. 6, 1882.

275,376. Valve-Gear for Steam-Engines: Alpheus C. Gallahue, Rhinebeck, N. Y. Filed July 24, 1882.

275,378. Cable Street Railway: Worcester Haddock, Cincinnati, Ohio, assignor to the National Cable Power Company, same place. Filed Nov. 12, 1881.

275,379. Gripping Attachment for Cable Railways: Worcester Haddock, Cincinnati, Ohio, assignor to the National Cable Power Company, same place. Filed Nov. 29, 1881.

275,397. Passenger Car: Aaron Longstreet, Chicago, Ill. Filed Dec. 24, 1881.

275,401. Snow-Remover: Friedrich W. Menze, West Bay City, Mich., assignor of one-half to Karl Gustav Adolph Kusch, same place. Filed Dec. 9, 1882.

275,438. Car-Coupling: James Mortimer Terry, Pontiac, Mich. Filed April 27, 1882.

275,448. Grain-Car Door: Edward M. Wilcox, Omaha, Neb., assignor of one-third to James Morris, same place. Filed Dec. 6, 1882.

275,460 Car-Coupling Link: John Bridge, Detroit, Mich. Filed Oct. 18, 1882.

275,469. Signal-Lamp Guard: Samuel W. Corwin, Paterson, N. J. Filed Dec. 4, 1882.

275,513. Car-Brake: James B. O'Donnell, Hazleton, Pa. Filed Sept. 18, 1882.

275,518. Railway-Switch: John H. Quimby, Concord, N. H. Filed Jan. 23, 1883.

275,532. Dumping-Car: John Smith and John P. Rhodes, Rockville Centre, N. Y. Filed Sept. 21, 1882.

275,547. Brake-Shoe: James Timms, Columbus, Ohio. Filed Feb. 19, 1883.

275,570. Nut and Lock for the Same: William V. R. Blighton and D. Franklin Blighton, Tonawanda, N. Y. Filed Feb. 13, 1883.

275,599. Apparatus for Automatically Stopping Railway Trains: William C. Crandell, Jr., Philadelphia, Pa., assignor of one-half to Samuel D. Strohm, same place. Filed Feb. 25, 1882.

275,609. Railroad Express Indicator: James H. Dumont, New York, N. Y. Filed Dec. 27, 1882.

275,650. Car-Brake: Gustavos Heidel, St. Louis, Mo. Filed Jan. 25, 1883.

275,659. Eccentric and Strap for Steam-Engines: Nathan Hunt, Salem, Ohio, assignor of one-half to the Buckeye Engine Company, same place. Filed Feb. 12, 1883.

275,662. Car-Coupling: Calvin P. Johnson and Samuel T. Walkley, Springfield, Mo. Filed Jan. 15, 1883.

275,711. Railroad-Switch: John T. Rigney, Baltimore, Md. Filed Oct. 28, 1882.

275,712. Car-Blind: Anthony Roelofs, Philadelphia, Pa. Filed Sept. 5, 1882.

275,717. Car-Coupling: Henry K. Sebring, East St. Louis, Ill., assignor of one-fourth to Charles W. Waughop, St. Louis, Mo. Filed Dec. 29, 1882.

275,720. Car-Coupling: James H. Simpson and John T. Wilson, Pittsburgh, Pa., assignors to Wilson, Walker & Co., (Limited,) same place. Filed Jan. 16, 1883.

275,721. Car-Coupling: James H. Simpson and John T. Wilson, Pittsburgh, Pa., assignor to Wilson, Walker & Co., (Limited,) same place. Filed Jan. 16, 1883.

275,725. Slide-Valve for Steam-Engines: Jesse M. Smith, Detroit, Mich. Filed Jan. 23, 1883.

275,728. Car-Tracker: Samuel J. Stewart, Philadelphia, Pa., assignor of one-half to William A. Levering, same place. Filed July 22, 1881.

275,735. Grain-Car Door: Winfield S. Voorhis and George H. Houser, Chicago, Ill. Filed Aug. 29, 1882.

275,739. Locomotive: Wm. T. Wells, Hackensack, N. J. Filed May 24, 1882.

275,754. Car-Coupling: James W. Cole, Huntington, Mass. Filed Oct. 11, 1882.

275,763. Device for Stacking Railroad-Rails, Lumber, etc: Stephen J. Guscott, Chicago, Ill. Filed Jan. 11, 1882.

275,781. Fare-Box: Michael W. Mahar, National Military Home, Ohio, assignor of three-fourths to John M. Patterson, Windfall, Ind. Filed Sept. 30, 1882.

BEARING DATE APRIL 17, 1883.

275,808. Tramway: Robert S. Cunningham, London, Charles V. Housaart, 72 Lichfield Road, Bow, County of Middlesex, and William May, 20 Broughton Street, Battersea, County of Surrey, England. Filed July 8, 1882. Patented in England Dec. 19, 1881, No. 5,556.

275,812. Locomotive Smoke-Box: James C. Farmer, Providence, R. I., assignor to himself, and Charles E. Ferreira, Quincy, Douglas A. Brooks, Braintree, and Charles H. Brown and Addison A. Reeve, both of Boston, Mass. Filed Aug. 9, 1882.

275,814. Car-Coupling: Albert Fischer, Detroit, Mich. Filed July 17, 1882.

275,830. Brake-Shoe: Robert Thomas King, Columbus, Ohio. Filed Feb. 21, 1883.

275,831. Brake for Locomotives and Tenders: Charles W. Laupher, Norwich, N. Y. Filed June 7, 1882.

275,839. Car-Coupling: Granville E. Medley, Hopkinsville, Ky. Filed Feb. 10, 1883.

275,852. Sliding Car-Door Hanger: Edwin Prescott, Arlington, Mass. Filed Jan. 15, 1883.

275,870. Car-Coupling: Alexander Story, Washington, Iowa. Filed Feb. 3, 1883.

275,879. Electric Signaling Apparatus for Railway-Trains: George M. Bedinger, Jr., Erlanger, Ky. Filed Oct. 11, 1882.

275,880. Car-Coupling: Robert Bigney, Copleston, Ontario, Canada. Filed Jan. 22, 1883. Patented in Canada Jan. 29, 1883, No. 16,214.

275,930. Car-Brake: Charles A. Millener, Deseronto, Ontario, Canada. Filed Feb. 21, 1883.

275,935. Sleeping-Car: Harry M. Neff, Denver, Colo. Filed Dec. 12, 1882.

275,943. Car-Coupling: Frederick A. Ray, Maryland, N. Y. Filed Nov. 24, 1882.

275,948. Car-Coupling: Walter D. Sandwich, Montgomery, Ala. Filed July 21, 1882.

275,991. Portable Railroad Dining-Table and Lunch-Case: Jno. M. Case, Columbus, Ohio, assignor of one-half to W. M. Kurtz, same place. Filed Sept. 20, 1882.

275,998. Stock-Car: Albert Chapman, Corunna, Mich. Filed Feb. 17, 1883.

276,005. Car-Coupling: Oliver S. Dale and Abram Barnes, Michigan City, Ind. Filed Feb. 28, 1883.

276,017. Car: John P. C. Foster, New Haven, Conn., assignor of one-half to Newell A. Thompson, Boston, Mass. Filed Feb. 19, 1883.

276,021. Electro-Pneumatic Railway-Signal: Oscar Gasseit, Boston, Mass., assignor to the Union Switch and Signal Company, Hartford, Conn., and Pittsburgh, Pa. Filed Feb. 1, 1881.

276,025. Car-Coupling: John Goeitel and Edward T. Slayton, St. Paul, Minn. Filed Oct. 17, 1882.

276,038. Electric Railway-Signal: Stephen C. Hendrickson, Brooklyn, N. Y., assignor to the Union Switch and Signal Company, Pittsburgh, Pa. Filed May 13, 1882.

276,047. Car-Wheel: Wm. R. Jenkins, Jr., Bellefonte, Pa. Filed Nov. 27, 1882.

276,051. Method of and Device for Coaling Locomotive-Tenders while in Motion: Michael H. Lantz, Marionville, Mo., assignor of one-fourth to Nelson Thomas Clevenger, same place. Filed Sept. 12, 1882.

276,053. Stock-Car: Henry A. Lewis, Wichita Falls, Tex. Filed Dec. 14, 1882.

276,070. Railroad-Frog: Denison C. Pierce, Chicago, Ill. Filed Nov. 3, 1882.

276,075. Tramway-Locomotive: Joseph Quick and Joseph Quick, Jr., Westminster, England. Filed Aug. 14, 1882. Patented in England Dec. 20, 1881, No. 5,575.

276,077. Railway Coaling-Station: William H. Ridgway, Coatesville, Pa. Filed Nov. 27, 1882.

276,088. Lifting-Jack for Raising Railroad-Tracks: James W. Snapp, Jasper, Tenn., assignor of one-half to Milton W. Anderson, same place. Filed Mar. 7, 1883.

276,089. Switch-Lock: David H. Speer, Pittsburgh, Pa. Filed July 14, 1882.

276,110. Car-Coupling: George W. Whittington, Xenia, Ohio. Filed Dec. 9, 1882.

276,122. Metallic Brake-Beam: William Woodcock, Elizabeth, N. J. Filed Feb. 12, 1883.

276,141. Car-Coupling: Isaac I. Keely, Anderson, Ind. Filed Jan. 12, 1883.

BEARING DATE APRIL 24, 1883.

276,150. Feed-Water Heater and Smoke-Stack Combined: James Armstrong, Bridgewater, N. Y., assignor to Jane C. Armstrong, same place. Filed Feb. 3, 1883.

276,168. Car-Coupling: Jno. Fashing, Winfield, Kans. Filed Feb. 28, 1883.

276,183. Car-Coupling: Marion Jacobs, Sturgis, Mich. Filed Aug. 21, 1882.

276,195. Journal-Box: George Sargood and Frederick L. Hemmer, East Arlington, Vt. Filed Sept. 15, 1882.

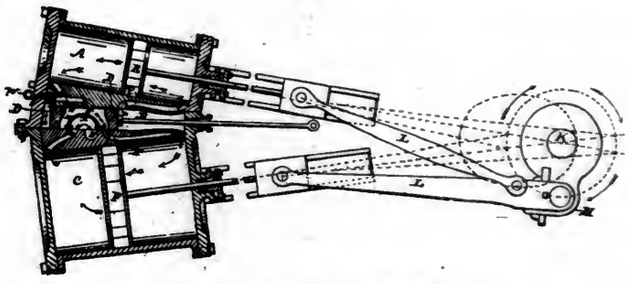
276,205. Car-Coupling: Lewis P. Whiting, Cleburne, Tex. Filed Feb. 23, 1883.
376,210. Car-Axle Box: William S. G. Baker, Baltimore, Md. Filed Feb. 27, 1883.
276,211. Car-Wheel: Marcellus O. Baldwin, Kansas City, Mo. Filed Nov. 14, 1882.
276,229: Car-Coupling: John E. Dickerson, Iberia, Mo. Filed Jan. 19, 1883.
276,239. Cable Railway: Andrew S. Hallidie, San Francisco, Cal. Filed Jan.
276,242. Railway-Rail: John F. Hanlon, Boston, assignor to George O. Hanlon and Joseph P. A. Hanlon, both of Cambridge, Mass. Filed Oct. 5, 1882. 2, 1883.
276,278. Signal-Lamp: Edwd. S. Piper, Toronto, Ontario, Canada. Filed Oct. 26, 1882.
276,322. Device for Rolling Railroad-Rails: Amos J. Acaster, Sheffield, County of York, England. Filed Feb. 1, 1883. Patented in England Dec. 24, 1881, No. 5,644.
276,358. Brake for Railways: Sutherland G. Colquhoun, Edinburgh, Scotland. Filed Sept. 22, 1882. Patented in England Mar. 18, 1880, No. 1,172.
276,370. Coupling for Brake-Rods: Edw. Ebi, Cedar Rapids, Iowa. Filed Mar. 9, 1883.
276,395. Snow-Plow: George A. Gunther, New Utrecht, N. Y. Filed Jan. 27, 1883.
276,414. Rail-Tie: Elias B. Hungerford, Corning, N. Y. Filed June 12, 1882.
276 428. Signal for Locomotive Head-Lights: Jno. Kirby, Jr., Ludlow, Ky., assignor to Post & Co., Cincinnati, Ohio. Filed Feb. 5, 1883.
276,452. Railroad Rail and Tie Elevator and Lifting-Jack: Truman C. Naramore, Williston, Vt. Filed Oct. 6, 1882.
276,441. Automatic Cash-Box System: Joseph C. Martin, Burlington, Vt. Filed May 22, 1882.
276,527. Nut-Lock: William M. Eccles, St. Louis, Mo., assignor of one-half to Isaac N. Byrns, same place. Filed Aug. 11, 1882.
276,545. Planking and Pavement. Samuel T. Williams, Red Bank, assignor of one-half to Andrew Albright, Newark, N. Y. Filed Dec. 15, 1882.

BEARING DATE MAY 1, 1883.

276,552. Revolving Switch-Stand for Railroads: Edward J. Beard and Howard V. Hinckley, Topeka, Kans. Filed Dec. 11, 1882.
276,554. Safety-Plate for Railroad-Switches: Aretus E. Black and Robert English, Marlette, Mich. Filed Dec. 9, 1882.
276,564. Safety Appliance for Railways: Albert G. Cummings, Harrisburg, assignor to the Pennsylvania Steel Company, Steelton, Pa. Filed Jan. 12, 1883.
276,569. Electric Railway: Leo Daft, Greenville, N. J. Filed Sept. 13, 1882.
276,592. Car-Door Fastening: William P. Jackson, Sedalia, Mo. Filed Dec. 29, 1882.
276,595. Stock-Car: Brantley P. Joiner, Florence, Ala. Filed Dec. 21, 1882.
276,644. Freight-Car Door: B. Frank Teal, Philadelphia, Pa. Filed May 11, 1882.
276,681. Car-Coupling: Henry Gross, Tiffin, Ohio. Filed Sept. 2, 1882.
276,712. Machinery for and Method of Manufacturing Steel Railway-Rails: Jacob Reese, Pittsburgh, Pa. Filed Nov. 7, 1882.
276,713. Fare-Register and Alarm: William J. Richardson, Brooklyn, N. Y. Filed Jan. 10, 1882.
276,716. Smoke-Stack: James Ritchie, Detroit, Mich. Filed Jan. 22, 1883.
276,727. Car-Wheel: William W. Snow, Ramapo, N. Y Filed Feb. 10, 1883.
276,762. Railroad-Switch: Thos. Breen, Knowlton, Pa. Filed April 22, 1882.
276,792. Railroad-Rail Joint: Joseph A. Eno, Newark, N. J. Filed Jan. 16, 1883.
276,794. Railroad-Switch: Albert T. Fay, Oak Park, Ill. Filed May 15, 1882.
276,801. Car-Signal: Robert P. Garsed, Norristown, Pa. Filed Mar. 30, 1882.
276,807. Electric Railway-Signal: Alvah W. Hall, Meriden, Conn. Filed Sept. 6, 1882.
276,814. Locomotive Head-Light: Arthur Harris, Chicago, Ill., assignor to J. McGregor Adams, same place. Filed Dec. 16, 1882.
276,872. Nut-Lock: John F. Penrod, Blairsville Intersection, Pa. Filed Dec. 22, 1882.
276,877. Spike-Extractor: Albert P. Prout, Wood Haven, N. Y. Filed Jan. 30, 1883.
276,878. Elevated Railway, Bridging, etc.: Louis T. Pyott, Philadelphia, Pa. Filed July 14, 1882.
276,900. Splice-Bar for Rail-Joints: Joseph S. Seaman, Pittsburgh, Pa., assignor to himself, James B. Young, and Robert Sleeth, all of same place. Filed Jan. 27, 1883.
276,904. Apparatus for Stopping Trains, Signaling, etc.: Wm. C. Shaffer, Philadelphia, Pa., assignor to the Railroad Safety Lock and Signal Company, of New Jersey. Filed Oct. 7, 1882.
276,905. Automatically Stopping Trains and Signaling: William C. Shaffer and Arthur M. White, Philadelphia, Pa., assignors to the Railroad Safety Lock and Signal Company, of New Jersey. Filed Jan. 2, 1883.
276,907. Locomotive-Cab Window: John Shields, Hancock, Mich. Filed Dec. 23, 1882.
276,928. Locomotive and Train Brake: Dolphus Torrey, New York, N. Y. Filed Mar. 20, 1882. Renewed Mar. 27, 1883.
276,930. Automatic Car-Brake: Dolphus Torrey, New York, N. Y. Filed June 29, 1882. Renewed April 13, 1883.
276,948. Tramway-Locomotive: William Wilkinson, Wigan, County of Lancaster, England. Filed May 18, 1882. Patented in England Oct. 1, 1881.
376,952. Refrigerator-Car: Samuel K. Bayley, Boston, Mass. Filed March 2, 1883.
276,977. Car-Coupling: Daniel Kunkel, Sr., Oregon, Mo. Filed Aug. 31, 1882.

BEARING DATE MAY 8, 1883.

276,999. Fender for Railway-Cars: Richard T. Bishop, St. Louis, Mo., assignor of one-half to Theodore Hunt, same place. Filed March 22, 1883.
277,000. Railway Sleeper and Chair: Thomas J. Bronson and Alexander Armstrong, Jacksonville, Ill. Filed Dec. 8, 1882.
277,034. Steam-Engine: Wm. E. Hil', Kalamazoo, Mich. Filed Aug. 10, 1882.
277,051. Car-Coupling: Charles P. Nicolson, Lamar, Mo. Filed Mar. 17, 1883.
277,098. Brake-Shoe: Warren M. Abbott, Chicago, Ill. Filed Mar. 12, 1883.
277,114. Car-Seat: Henry B. Cobb, Wilmington, Del. Filed July 13, 1882.
277,118. Apparatus for Operating Railway-Signals: Albert G. Cummings, Harrisburg, assignor to the Pennsylvania Steel Company, Steelton, Pa. Filed Mar. 12, 1883.
277,127. Automatic Car-Stove-Fire Extinguisher: James F. Gyles, Chicago, Ill. Filed Feb. 7, 1883.
277,130. Register: Joseph L. Harley, Baltimore, Md. Filed Jan. 23, 1883.
277,150. Refrigerating Chamber, Car, and Apparatus: Isaac Myer, Philadelphia, Pa., and Samuel K. Bayley, Boston, Mass. Filed July 13, 1882.
277,152. Car-Coupling: William Nunamaker, Kansas City, Mo. Filed March 10, 1883.
277,159. Brake-Shoe: David Prew, Providence, R. I. Filed Feb. 8, 1883.
277,200. Railroad-Signal: Walter C. Beckwith, Norwalk, Ohio. Filed Dec. 5, 1882.
277,242. Car-Coupling: Clarence C. Delano, Musson, La. Filed Aug. 16, 1882.
277,274. Car-Brake: Alfred E. Harris, Mile End Road, County of Middlesex, England. Filed Jan. 13, 1883. Patented in England June 6, 1882, No. 2,657; in France Dec. 5, 1882, No. 152,462, and in Belgium Dec. 7, 1882, No. 59,769.
277,275. Car-Coupling: Baldwin W. Harry and John C. Kieffer, Milton Centre, Ohio. Filed Feb. 27, 1883.
277,300. Car-Coupling: John C. Look, Yuba City, Cal. Filed Mar. 9, 1883.
277,302. Reversible Railway-Skid: Samuel Lowe, Denver, Colo. Filed Jan. 25, 1883.
277.333. Iron Cross-Tie: John Parr, Humboldt, Nebr. Filed Dec. 29, 1882.
277.336. Nut-Lock: James M. Perry, Sharon, Pa. Filed Feb. 19, 1883.
277,350. Dumping-Car: Charles Rohne and Johann Moenke, Hoboken, N. J. Filed Mar. 15, 1883.
277,358. Electric Signaling Apparatus for Railway-Trains: Fred. A. Shaw and Henry E. Judkins, Portland, Me.; said Shaw assignor to said Judkins. Filed Jan. 10, 1883.
277,360. Brake-Block: Manuel Joseph Siqueira, Brooklyn, Cal. Filed March 20, 1883.
277,363. Car-Coupling: Earl Sidney Smith, Chase, Mich. Filed Mar. 7, 1883.
277,379. Car-Coupling: Job Thigpen, Greenville, Ala. Filed Mar. 22, 1883.
277,382. Car-Axle Box: James Timms, Columbus, Ohio. Filed Feb. 19, 1883.
277,390. Circuit-Instrument for Electric Railway-Signals: Jos. Weis, Jersey City, N. J. Filed Aug. 16, 1882.
277,428. Locomotive: Oscar Rothrock, Beech Creek, Pa. Filed Feb. 17, 1883.
277,436. Car-Brake: Watson P. Widdifield, Uxbridge, Ontario, Canada. Filed Nov. 4, 1882.



Improved Compound Engine.

H. and W. Monk's recent invention in compound engines, patented the 27th day of February, 1883, consists in improved combination and arrangement of mechanism.

The high and low pressure cylinders are arranged in or about the same plane, but at an angle to each other. The piston rod of the large or low pressure cylinder is connected by a rod directly to the main crank. That of the small or high pressure is connected by a rod to the connecting rod of the large cylinder near the crank pin. By means of these arrangements the engine has

no dead centre. One valve chest for the high and low pressure cylinder is formed between the two cylinders, and one doubled-faced equilibrium valve is placed between the two port facings to regulate the admission of the steam, and exhaustion from both cylinders. This double valve is formed in two parts provided with parts and passages, and one part has a cylindrical projection which acts as a piston and fits a corresponding cylinder in the other part of the valve; the piston having suitable packing rings to keep it steam tight. The two parts of the valve are kept asunder with their faces against their respective port facings on the cylinders, by the action of springs being placed between them, and the pressure of the same on the margin of the valve; this doubled-faced valve being thus an equilibrium valve with only sufficient back pressure to keep both parts of the valve tight against their respective port facings. There is a small valve in the valve chest which can be opened and closed at will, for admitting steam from the valve chest to a passage which has a port coming opposite one in the main valve. By this means boiler or high pressure steam can be admitted when desired directly into the large or low pressure cylinder.

This engine is more particularly designed for locomotives. It has long been the study of mechanical engineers how to obtain better results by utilizing expansive force of steam on locomotives. It is a well-known fact that with the present arrangement of cylinders and slide valve operated by the ordinary link motion, it is impossible to admit and cut steam off early in the stroke of the piston, without withdrawing it or letting the exhaust escape too soon, and at a comparatively high pressure; for the average pressure of the steam when exhausted from the generality of locomotives averages from sixty lbs. to 100 lbs. above the atmospheric pressure. This shows a great waste of steam, for if its expansive force was properly developed it would have expended about double the energy utilized before its escape. Monk's Compound Engine will develop the full expansive force of the steam, and at the same time give a locomotive using their cylinders many other advantages. In a locomotive thus provided two cylinders, one valve, and valve chest are placed on one side of a locomotive, the cylinder and chest being so combined that they superheat each other, and the radiating space is greatly reduced, thereby avoiding the condensing of the steam. The cylinders and chest take up little more space than the ordinary cylinders used on locomotives. The high pressure cylinder will be less than half the size of the present locomotive's cylinder. The exhaust steam from this cylinder passes directly through the valve into the low pressure cylinder, which is four times the area of the high pressure cylinder. By this means the expansive force of the steam is utilized; for, say the boiler pressure to be 140 lbs., and steam supplied the high pressure cylinder for the full stroke of the piston, the average pressure of steam exerting its power on the low pressure piston would be about forty to forty-five lbs. above atmosphere. Taking the back pressure of the high pressure piston, its effective power would be 100 lbs. The low pressure piston having forty lbs., and its area being four times that of the high pressure piston, the figures will stand thus:—high pressure 100; low pressure equal to four times forty is 160 lbs.; total effective piston power 260 lbs. This result has been proved by the indicator. The figures will, however, deviate according to where the valve is made to cut off the steam. The valve is arranged so that it will cut the steam off early in the stroke of the high pressure piston and still let the exhaust escape into the low pressure cylinder to supply its piston with steam for the full length of the stroke. By this means the steam can be fully expanded and its energy properly developed. The cylinder being angled, one piston always travels slightly in advance of the other. Thus the full strain of both pistons is not put on the crank when it is on or near the centre, for one piston acts to counteract the other. The sudden shocks and strains which are now characteristic of locomotives when the crank is on or near the centre, are thus avoided. There is an attachment which connects with the ordinary reversing lever to a small valve in the valve chest, and it is only necessary for the engineer to put the lever right forward or right back, and boiler steam will then be admitted into the low pressure cylinder, which will give the engine a great extra power—equal to about twice the power of the ordinary locomotive. This power can be used to start a very heavy train, or to haul it up a heavy grade, or to work in a snow storm, or in case of the cylinders being broken on one side. The engine would in this case have the power to haul the train to its destination, for as the engine cannot be put on a dead point or center, and the low pressure cylinder being about twice the size of the ordinary locomotives, the engine would have this power. It is only necessary for the engineer to pull the reversing lever up one notch, and then the engine will be working the steam compound form. By adapting Monk's engine on locomotives the increase in weight and reciprocating motion is very slight. The cylinders and valve chest are so compact that they take up very little space; and as two pistons are connected to one crank, and one valve and valve motion operates steam into two cylinders, it does not complicate a locomotive in any form.

The general advantages obtained by using Monk's Cylinders are as follows: 1. A saving in fuel of about one third obtained by using the expansive force of steam; 2. A locomotive will travel nearly twice as far with the same amount of water used at present; 3. The blast will not be so strong, and sparks will be less liable to be thrown out of the stack; 4. There will be a great saving in smoke stacks, nettings, tubes, and fire boxes; 5. The valve being an equilibrium valve, the friction and strains on the valve and valve motion are greatly reduced, the engine will run more freely accordingly; 6. The engine always has a reserve power equal to twice that of the present locomotive.

Monk's engine will also work with efficiency in steam yachts, steam launches and steam tugs.

Its inventors are Messrs. H. and W. Monk, Hadlow, South Quebec, Canada.

Freight-Car Door Fastening.

This is a simple and inexpensive device recently patented, that when applied to the doors of freight-cars will entirely do away with the necessity for using all styles of fastenings now in use, including the cleating of doors, saving the cost of cleating, the time taken in putting them on, tearing them off, and the mutilation of cars.

FIG. 1.

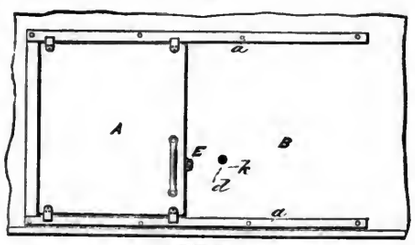


FIG. 2.

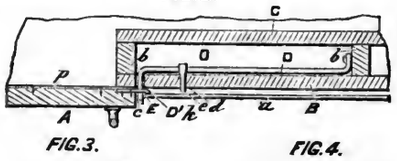


FIG. 3.

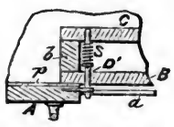
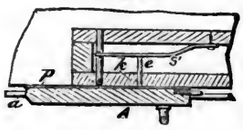


FIG. 4.



The device costs but very little if any more than the ordinary fastenings, is not at all liable to get out of order, and is automatic in its action in fastening the doors, closed tight and secure in place. As it cannot be damaged by freight in the car, nor from outside of the car, it should last as long as the car itself. The end of the bolt can be made of any shape, with a slot for seal, or to intersect with and form the bolt of a lock, or both.

Figure 1 is a front elevation view of a car-door to which this improved fastening device is applied. Fig. 2 is a horizontal sectional view of the same. Figs. 3 and 4 are sectional views, showing modifications in the construction thereof.

Similar letters of reference refer to similar parts throughout the several views.

In the accompanying drawings, A represents an ordinary sliding door of a freight-car, sliding on the customary rods or ways, *a a*.

B is the side wall of the car, and C the inside lining or ceiling, with the space O between, formed by the upright pieces *b b*.

Within the space O, between the lining C and outer wall, B, is placed the fastening device D, which consists in a spring rod or bar, D, secured at one end to one of the uprights *b*, and the other end bent at right angles, and with the right angled part D' projecting through the wall B of the car, just behind the edge of the door A when said door is closed. Secured in the edge of the door by means of a wood-screw, or in any other suitable manner, is an eye, E, in which the projecting part D' of rod D enters when the door is closed. A short distance from the right-angle part D' on the rod D is attached the end of a push-rod, *e*, which projects through the side wall, B, by means of which the rod D may be pushed in, withdrawing the part D' from the eye E. The end of the part D' is provided with an opening, *c*, in which the customary seal or lock may be placed.

The device is intended to be placed on the side of the car-door in the direction in which it slides, and is operated as follows: The door being closed, the part D', by reason of the spring-rod D, enters the eye E, and the door is fastened. To open the door, press on the rod *k*, which withdraws the part D' from the eye E. The door A may now be slid open, and as it passes over the end of the part D' holds it back, flush with the side B. Upon pushing the door shut the part D' immediately springs out and fastens the door.

The device admits of many modifications, as shown in Figs. 3 and 4. Instead of the rod D, a straight bolt, D', may be used, which slides back and forth in bearings in the side wall, B, and lining C, a coil-spring, *s*, being used to press it outward; or, instead of the coil-spring *s*, a leaf-spring, *s'*, may be substituted, as shown in Fig. 4.

The Western Railroad Association having reported favorably on this patent, correspondence is solicited by the patentee, T. W. Cooke, Local Freight Agent C., B. & Q. R. R., Chicago.



New Passenger Car Coupler.

The above is an illustration of a new passenger car coupler patented by M. Peters, Jr., of Chicago. As will be seen the coupler is of two pieces, the pulling being of Bessemer steel cast into the top piece or draw-head. The coupler is at the same time a bumper.

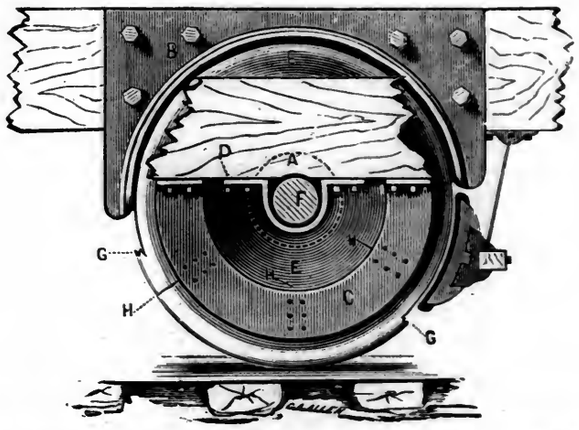
In case a car gets derailed it will disengage itself either from car ahead, car in rear, or from both by pulling out sideways. In case a car capsizes, it will disengage itself from the next car, as the two draw-heads will face and drop downwards and release the cars. The two former casualties excepted, the couplers cannot get disengaged from any motion to which trains are subject.

The only way to disengage them is by lifting either one of the draw-heads through the means of a chain, by which action the pulling pin of the one lifted will raise the draw-head of the other coupler as soon as it touches the cross-pin of the other to a certain extent, and release both couplers. As the widest part in the intersection is the middle it allows ample space to turn the shortest curves.

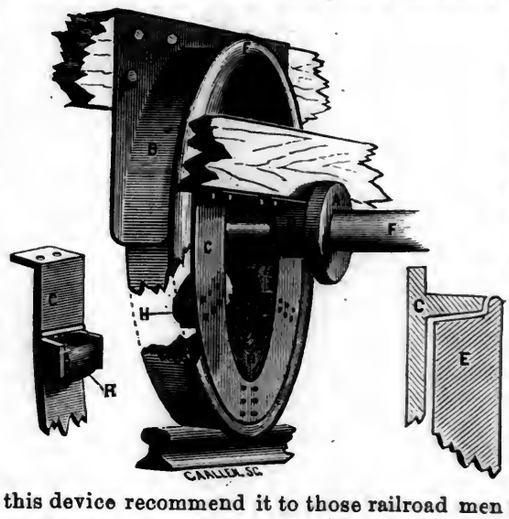
This coupler is worth the consideration of railroad men and car builders.

Raddin's Safety Attachment for Cars, and Train-Brake.

Mr. John Raddin, of Lynn, Mass., is favorably known for his invention of improvements aiding the safety and comfort of railway travel. Accompanying are cuts showing his Safety Attachment for cars. The public demand for faster travel is being met by the principal roads, and hence the necessity of providing greater security. Every reader will recall instances of the breakage of an axle or wheel involving disastrous consequences. The intention of Mr. Raddin's Attachment is to provide that a car fitted with it will run safely a reasonable distance—from twenty-five to fifty miles, certainly—after an axle or wheel is broken. As the cost of the Attachment is only about fifty dollars a car, time is well spent in its examination, as aided by the accompanying cuts.



Now ordinarily when an axle breaks, the opposite wheel will leave the track, as there is nothing to keep it on, and the wheel will drop and throw the car at right angles. The reader will remember an instance of this kind on the Boston and Maine Railroad, when a car thrown into the position indicated by the breaking of an axle, struck the truss of a bridge and knocked it down, costing the company a quarter of a million dollars. In Mr. Raddin's improvement, the axle being provided with collars A and boxes D, in case of breakage of either end it is held in position and will continue to run the same as though it was not broken. A plate B, secured to the truck frame, and coming down about half way on each side of the wheel, about three-eighths of an inch space between the wheel and plate, in case of the axle breaking the plate will drop easily on to the wheel and push it along with the train. The supporting plate C, with its rollers secured to the truck frame on the inside, to keep the wheel E plumb and the lip against the rail, preventing its tripping and getting off the track. In a broken axle or wheel, the



combination of plate B and supporting plate C, collar A, box D and broken axle F secured to the truck frame, it will be readily seen that either axle or wheel will continue to run without accident. The simplicity and cheapness of this device recommend it to those railroad men who have faith in the oft-repeated statement that their adoption of whatever

aids the safety and comfort of railroad travel brings a corresponding increase of business and profit.

Raddin's Train Brake is so constructed that no alteration is necessary to apply it to the Hodges or Stevens Hand Brake now in general use. It can be applied by the engineer by taking steam from the boiler and conducting it to a cylinder under the same. To connect either of the brakes with the locomotive, each car is provided with two sliding bars suspended on rollers, and are attached to the hand brake levers with a chain, permitting the brakes to be applied separately. The bars are coupled on the right hand side of the train, and connected to the piston of the cylinder. A sufficient number of cars are coupled to enable the engineer to bring the train under his control. Also, on a long freight train, the bars on the left hand side of the rear end can be connected and applied by the brakeman. To connect the bars right, apply the hand brake to the rear car, and straighten out the loose links, then couple the bars. To couple the cars closely, a coupling should be used which permits cars of different heights to be coupled. It will readily be seen that the application of Raddin's Train Brake is simply a matter of the addition and attachment to the present hand brake system of two sliding bars, provided at each end with couplers; and also, that when the bars are coupled and the power applied from the engine, the brakes are evenly, uniformly and simultaneously applied throughout the train. This Brake, uncoupled, will apply itself to cars of various roads in the middle of a train by the engineer slacking the engine, and the momentum applies the brakes. The engineer can back his train at once after stopping.

Mr. Raddin, whose address we have given, gives careful attention to all inquiries addressed to him.

Pursley's Car-Coupling.

This invention, by John J. Pursley, of Wetmore, Kansas, is covered by two patents, the first dated December 19, 1882; and the second February 6, 1883. We may add that all railroad men who have seen it speak of it as well adapted to its purpose.

The claim protected by the first patent covers the draw-head and slotted metal plate in combination with the cone, said cone having an elongated channel, within which is pivoted a lever which operates the slotted plate, and the guide-tongue and coupling-pin whereby the cars are automatically coupled; the combination of the cone having the passage for the coupling-pin, and the elongated passage, having pivoted therein the lever, with the draw-head, having recess and channel, having working therein coupling-plate and pin; and the draw-head, in combination with the guide-tongue operated by the handle, coupling-pin, dome, working-lever and sliding-plate.

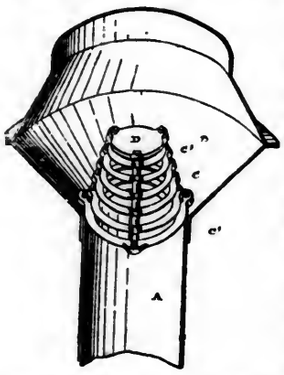
Claimed under the second patent are the draw-head, in combination with guide-tongue operated by a handle, the spring and coupling-plate, said plate having lug and hook-like projections, and bearing or resting against seats formed in the draw-head, whereby the strain upon the pivot of the plate is relieved.

Hunter's Underground Conductor.

The invention, recently patented, of Rudolph M. Hunter, of Philadelphia, has reference to underground conduits for electric wires in general, and it consists in providing these conduits with means to force air or gas into same under pressure, and adapted to keep the said air or gas under pressure continually, if so desired; further, in providing the conduit with one or more receptacles adapted to contain absorbents for moisture. The object of the invention is to provide suitable means to prevent the escape of electricity from the wires in underground conduits or reduce the escapage to a minimum. This is particularly necessary in the use of underground electric light wires, for on long circuits the lights on the farthest end of the line or circuit burn dimly and are incapable of giving that brilliancy of illumination for which they are designed unless the intensity of the electric current is greatly increased over the normal, and this is injurious to the lamps near dynamo-electric machines, and requires a greatly increased expenditure of power used in the generation of the current. By the use of Mr. Hunter's invention the distant lamps burn as brilliantly as those near the generators, and all burn with a maximum brilliancy without increasing the intensity of the current over the normal, and with a minimum expenditure of power. Said invention depends principally upon two phenomena—viz., the absorption of the moisture from within the conduit by chemicals to prevent undue escape of electricity, the moisture rendering the air in the conduit a good conductor, and increasing the pressure of the air or gaseous medium around the conductors and within the conduit, the same preventing the free escape of electricity from the wires. The greater the pressure and more free the air is from moisture the less liability is there for the escape of electricity.

Patterson's Spark Arrester.

The accompanying illustration is of Patterson's Spark Arrester, lately patented in this country. Mr. Thomas Patterson, its inventor, resides at Stratford, Ontario, Canada.



His device relates more particularly to that class of spark arresters adapted for locomotive engines, and its object is to produce an arrester so effectual as to prevent the escape of any sparks large enough to set on fire material of the most inflammable nature. It consists essentially in placing at the junction between the smoke-pipe and bonnet a cone-frustum-shaped cage composed of a series of metal rings, reducing in diameter from the bottom ring to the top, where an inverted cone is placed to form a cover, the interior surfaces of the rings being fluted for the purpose of forming a grating to grind the sparks as they are driven into the cage by the action of the exhaust.

Mr. Patterson calls his invention the Chilled Spark Arrester, and claims the following as benefits derived from its use: (1) The sparks are ground up so fine that by the time they reach the ground they will not burn a blade of grass; (2) Engines steam better with it than with the old arrangement; (3) Engines will run about three hundred thousand miles before the cage is worn out; and (4) As all the pounding of sparks is done in the cage, the netting and stack will therefore last treble the time of those fitted with the old arrangement.

Given's Safety Guard for Railways.

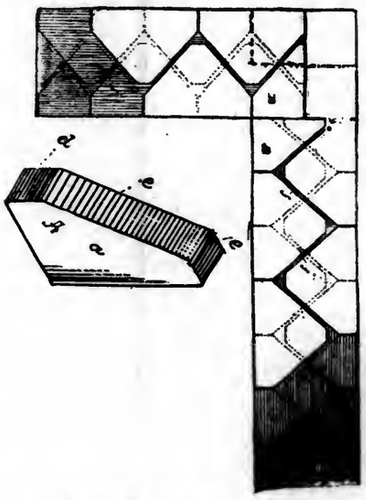
Mr. Philonzo F. Given, of Cedar Rapids, Ia., has invented a safety-guard for railways, respecting which it is stated that with it properly in position, "no living man can fasten his foot so that it will not instantly come out." This being given as a fact the "touch of nature" prompts inquiry into the means devised by Mr. Given to prevent loss of life and maiming from pedal captivity on railroads.

The danger sought to be obviated lies at the end of the guard rails; and its prevention must be by means of a device extending back far enough, in frogs and switches, to allow the feet to pass freely between the rails. Generally described, Mr. Given's invention consists in a reversible elastic cushion, made preferably of rubber. The cushion is made thinnest along its middle longitudinal line equi-distant from the rails, and then gradually thickened on both its upper and under faces outwardly from

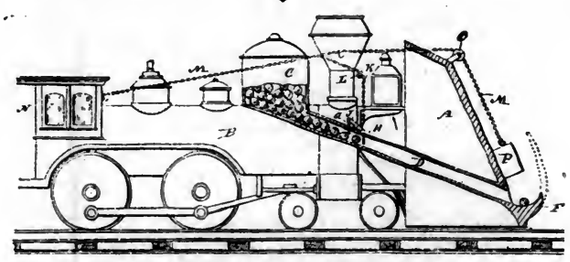
this middle line to the points where it comes in contact with the outer edges of the heads and with the upper faces of the feet or bases of the rails. From these points of contact it is extended to and is firmly abutted against their adjacent vertical faces. It is thus given a firm seat, from which it cannot be easily displaced, and at the same time possesses an elasticity by which it adapts itself to the pressure of and will not be subjected to great wear or liability to injury from the passing car-wheels.

A New Building Material.

Allen Ingalls, of Cooperstown N. Y., has invented a new and valuable mode of making material for constructing buildings of block or brick. By mixing sand, broken stone and cement, and cast in a mold, he has artificial stone of which houses, beautiful and durable, can be built. The blocks are laid in courses, each course consists of two rows of blocks, the tapering ends of the blocks in each row pointing inward, and the projecting tapering ends of one row entering the recess between the tapering projecting ends of the opposite row, the blocks being so laid that between the two rows of each course there extends a continuous zigzag air chamber or space. Thus the walls are traversed by an air chamber of very considerable area throughout its extent, while at the same time the blocks are bound as firmly together as though there was no air space. The U. S. Government has granted Mr. Ingalls the exclusive right to make, use and vend the said invention throughout the United States and territories.



Persons wishing to build houses or barns by using the above patent right, can erect a building beautiful and durable, at less expense than by any other means.



New and Unique Snow-Plow.

George A. Gunther, of New Utrecht, N. Y., is, we believe, the first to introduce an invention, the adoption of which by the railroad companies, particularly in the States and territories of the Northwest, would prevent, as it appears to us, the loss of a great deal of property and time from the storms which are apt to blockade the lines during the winter months. Methods of remedying the delay and destruction caused by these visitations have been used, but without the success which his new and unique way of dealing with blockading snow promises to make practicable.

Readers are aware that some twenty-five thousand miles of railroads in the United States are more or less injuriously affected by snow storms to an incalculable loss to the companies and the community. The ordinary snow-plow and shovel have not been found adequate to cope with a difficulty the magnitude of which is suggested by the fact that in October, 1881, the Chicago and Northwestern Railway Co. spent over three hundred thousand dollars in the fight against snow. Thirty-four immense snow-plows had plenty of work, and these were backed up tremendously by from two to six locomotives each. According to an account which appeared in the Appleton *Post*, one of these plows weighing forty-eight thousand pounds, ballasted by eighty thousand pounds of railway iron and driven by six locomotives, attacked a snow-choked cutting, but was defeated. Nine thousand men were employed from time to time during the winter of 1881-2 on the same line as shovellers.

Mr. Gunther's plan of dealing with the huge difficulty indicated in the above facts, is to explode torpedoes at the front of a plow to facilitate its entrance into the snow. The illustration gives a better idea than merely verbal description of the means he adopts to effect this. Torpedoes are fed to the anvil and exploded thereon by machinery under the control of the engineer.

We subjoin his claim as covered by letters patent from the United States Patent Office, No. 276,395. By means of the illustration the peculiarities of Mr. Gunther's invention are easily apprehended:

Claim—The method, substantially as herein shown and described, of loosening and removing snow and facilitating the entrance of a snow-plow into the snow, consisting in placing torpedoes or explosive cartridges on a snow-plow and exploding the said torpedoes, as set forth. 2. The combination, with a snow-plow, of devices for exploding torpedoes on the said plow, substantially as herein shown and described, and for the purpose set forth. 3. The combination, with a snow-plow, of devices for receiving torpedoes to be exploded on the said plow, substantially as herein shown and described, and for the purpose set forth. 4. The combination, with a snow-plow, of devices for receiving torpedoes and devices for exploding the said torpedoes, substantially as herein shown and described, and for the purpose set forth. 5. The combination, with a snow-plow, of devices for exploding torpedoes placed on the plow, and of appliances for operating the said devices for exploding the said torpedoes from the caboose of the locomotive, substantially as herein shown and described, and for the purpose set forth. 6, The combination, with a snow-plow, of devices for feeding torpedoes to the front of a snow-plow, and of devices for exploding said torpedoes, substantially as herein shown and described, and for the purpose set forth. 7. The combination, with a snow-plow, of a receptacle for torpedoes on a locomotive or car, a device for conducting the torpedoes to the front of the snow-plow, and devices for exploding the torpedoes, substantially as herein shown and described, and for the purpose set forth. 8. The combination, with a snow-plow, of the receptacle C on a locomotive or car, the anvil or lug F on the plow, the tube D for conducting the torpedo from the receptacle C to the anvil F, the chain M, and the block or hammer P, substantially as herein shown and described, and for the purpose set forth. 9. The combination, with a snow-plow, of the receptacle C on a locotive or car, the anvil or lug F on the front of the plow, the tube D, extending from the receptacle C to the anvil F, the block or hammer P, valves or gates in the tube D, and a chain or rope connecting the valves in the tube D, and the chain M, substantially as herein shown and described, and for the purpose set forth. 10. The combination, with a snow-plow, of a receptacle for containing torpedoes, a tube for conducting the torpedoes to the front of the plow, valves in the said tube, a block or hammer for exploding the torpedoes, and devices for raising the hammer and operating the valves simultaneously, substantially as herein shown and described, and for the purpose set forth.

The time is opportune, when the snow difficulty no longer exists and will not exist for several months to come, for companies interested in reducing the damage inflicted by it to a minimum, to acquaint themselves with an invention to this end obviously promising of profitable consequences in its use.

A Freight Car Coupler.

A NEW device for coupling freight cars, designed to lessen the risks of a brakeman's life, was exhibited in the yards of the New York, Lake Erie and Western Railroad Company, at Jersey City, on the 17th ult., by E. N. Gifford, the inventor, and J. B. McCormick, of the Cincinnati *Enquirer*, capitalist. As described: "A flat, cam-faced steel pin works in a slot in a bell-mouthed draw-bar in such a manner that the bottom of the pin rests at the foot of an inclined plane. When the link enters the mouth of the draw-bar it pushes the pin back and up the inclined plane until the bottom is so high that the link passes under it, when the pin drops through the opening in the link, seats itself by force of gravitation, and the coupling is made. Railroad representatives from all the lines running out of New York witnessed the test, and many of them were very favorably impressed with it.

A Summer Note Book.

WE have received from J. R. WOOD, General Passenger Agent Pennsylvania Railroad Company a small volume 5¼x6½ inches, containing fifty or more pages, entitled "Cape May to Atlantic City"—designed more especially for the perusal of those who propose to patronize, during the coming season, the seashore resorts of the New Jersey Coast. It is very artistically gotten up, with a beautifully tinted paper cover, on which is a representation of a lady standing on the beach while the surf laves the sands at her feet, holding to her ear a conch shell through the medium of which she hopes to receive "A Message from the Sea." A vessel hull-down is seen in the distance, while the seagulls above are flapping their wings in the air. The attractions of the various summer resorts upon the shores of New Jersey are recounted under the captions of "The Invitation," "Cape May," "The Life Along the Shore," "Cape May to Atlantic City," "Rod and Gun," "Atlantic City," and "The Coast Climate," to which is added a chapter on "The Art of Traveling." The text, which is both entertaining and instructive, is interspersed with from twenty to thirty engravings descriptive of the attractions to be found at these visiting places. There are also instructions as to "How to Get There" and "Where to Stay." A page is devoted to "Hints to Bathers," while a map of "The Jersey Coast" closes the volume.

Sleeping Cars for the Canadian Pacific Railway.

FOUR elegant sleeping cars for the Canadian Pacific Railway Company have just been completed by the Harlan & Hollingsworth Company, of Wilmington, Del. They are named the Keewatin, the Assiniboine, the Qu'Appele and the Kaministiquia. They are each 58 feet long, 9 feet 10½ inches wide, and 9 feet 8 inches high in the center. The body of each car contains twelve berth sections, with all the latest improvements. Each berth is furnished with an improved woven wire mattress in addition to the ordinary hair mattress. Each car also contains a state room with a berth section, as well as linen closets, dressing rooms, heater room, etc. All the doors contain as panels mirrors of beveled plate glass. The windows have a double sash, and are each supplied with a spring roller curtain. The men's dressing room and the ladies' saloon are handsomely furnished and supplied with every necessary convenience. Each car is lighted by six double chandeliers of the Adams & Westlake pattern, and heated by a Searle's patent car heater, from which pipes run along the sides of the car and under every seat. The cars have end ventilation and pivoted transoms. They are supplied with the Miller platform. The trucks are of the Canadian Pacific Railway standard with six wheels each; the latter of steel and 40 inches in diameter. The cars are also furnished with French's elliptical and spiral springs and Westinghouse automatic air brakes, as well as double acting hand brakes. Their destination is Winnepeg, Manitoba.

An Instantaneous Light.

SUCH, in a word, is the unique apparatus on exhibition at the rooms of the Portable Electric Light Company, 22 Water street, Boston. It occupies the space of only five square inches and weighs but five pounds, and can be carried with ease. The light requires no extra power, wires, or connections, and is so constructed that any part can be replaced at small cost. The chemicals are placed in a glass retort; a carbon and zinc apparatus, with a spiral platinum attachment, is then adjusted so as to form a battery, and the light is ready. The pressure on a little knob produces an electric current, by which the spiral of platinum is heated to incandescence. The Portable Electric Light Company was recently incorporated with a capital of $100,000, under the laws of Massachusetts. Some of the prominent business men of the State are identified with this enterprise. In addition to its use as a lighter, the apparatus can also be used in connection with a burglar-alarm and a galvanic battery.

IN Spain a railway train has been adopted consisting of two engines and twenty-four carriages, which contains a complete equipment for the reception, for a lengthened period, of eight officers and 136 men, and forms a little moveable war depot. The carriages are iron-clad and provided with loopholes, and the train carries four guns. Nervous Western travelers would feel very much relieved by having such a conveyance.

THE commissioner of internal revenue has decided to return after the 1st of July checks and drafts imprinted with the two-cent revenue stamps when desired with the word "redeemed" stamped upon each check. This will enable banks and bankers to use the stamped checks after their redemption.

A MAN who knows the world will not only make the most of everything he does know, but of many things he does not know, and will gain more credit by his adroit mode of hiding his ignorance than the pedant by his awkward attempt to exhibit his erudition.—*Colton.*

LAST CHANCE is the name of a new town on the Northern Pacific Railroad, 586 miles from Portland, Oregon.

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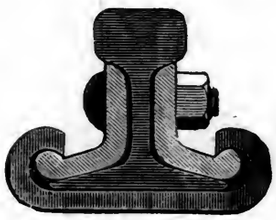
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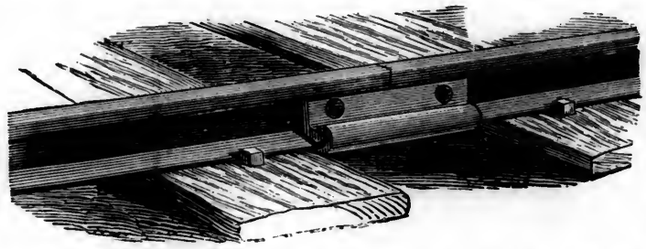
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"36 per cent of coal saved and the car kept noticeably warmer!" by using THE SALMON CAR HEATER.

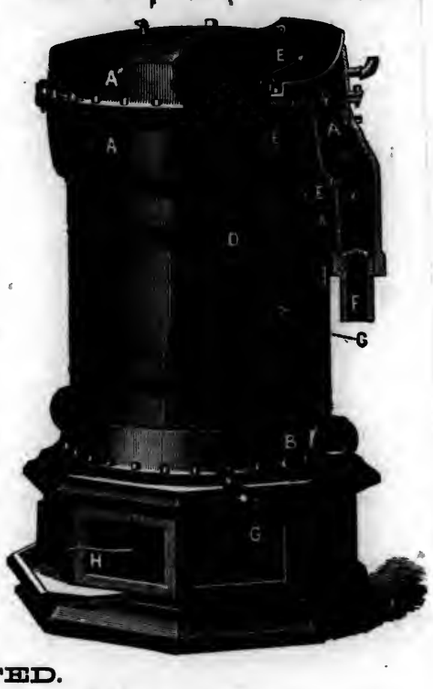
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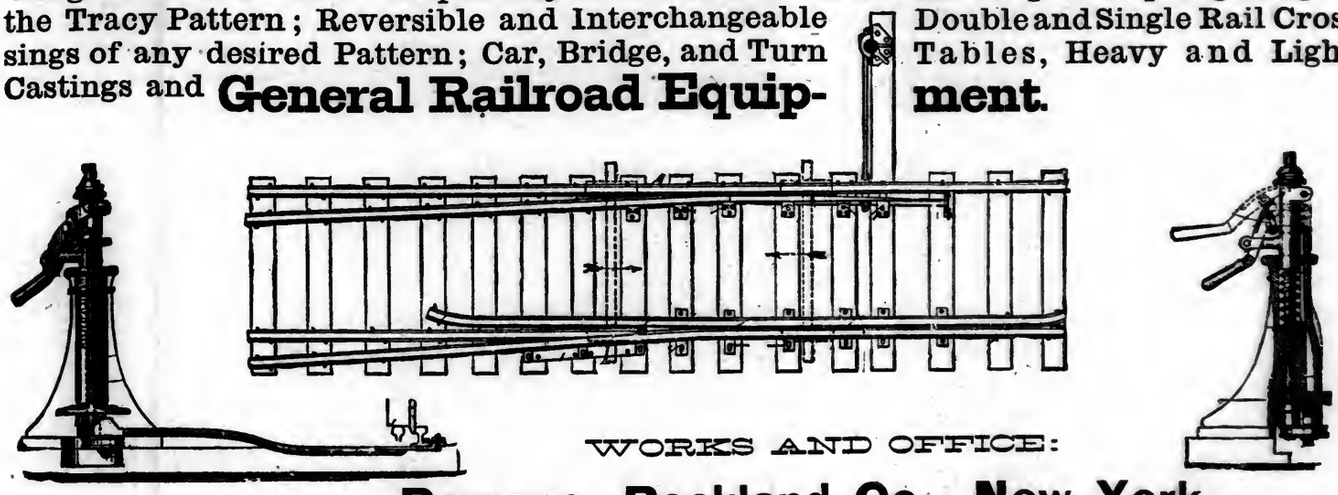
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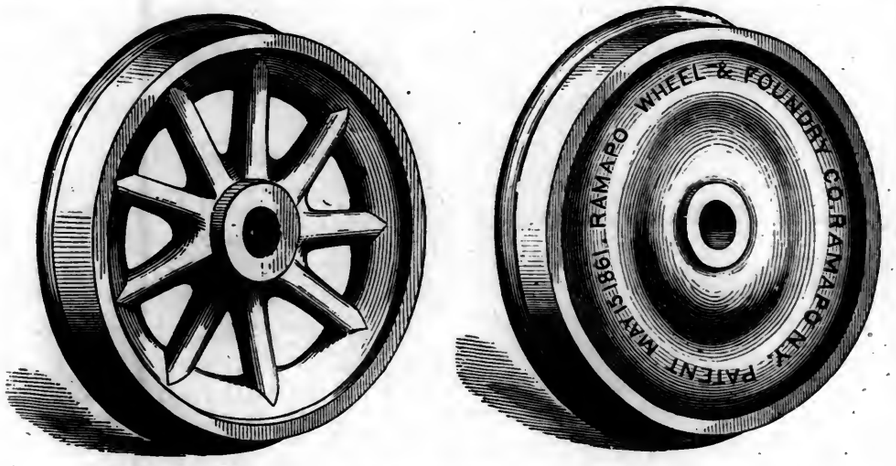
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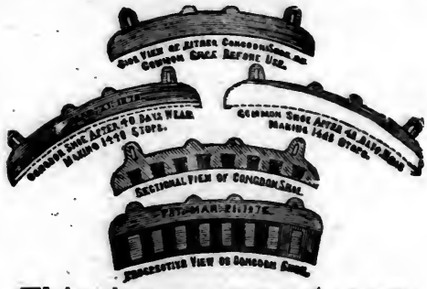
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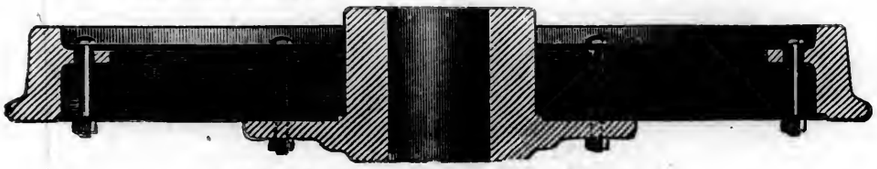
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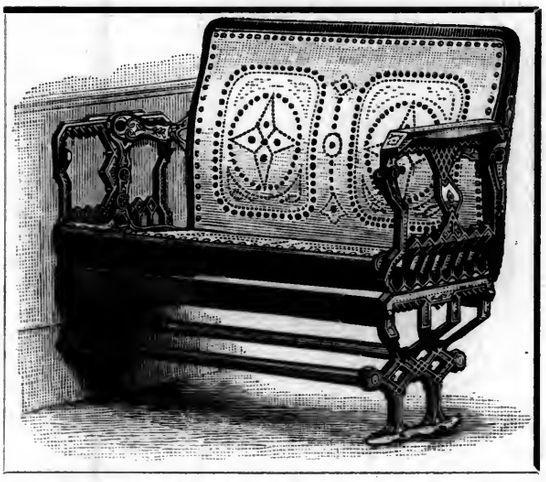
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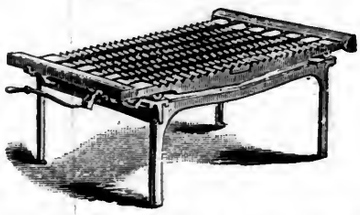
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AMERICAN
Railroad Journal
·ESTABLISHED·1831·

Steam Navigation, Commerce and Finance, Tramways, New Inventions, Machinery, Mining.

WHOLE No. 2,451.] NEW YORK, JUNE, 1883. [VOLUME LVII.—No. 3.

CONSOLIDATION.

THE Junction and Breakwater, the Breakwater and Frankford, and the Worcester Railroad Companies have been consolidated under the name of the Delaware, Maryland and Virginia Railroad Company. The main line now extends from Franklin, Va., to Harrington, Del., the line to Lewes and Rehoboth being a branch. The directors of the consolidated company, elected on the 1st inst., are: N. L. McCready, John M. Robinson, Thomas Baumgardner, J. Bodine, J. W. Causey, J. T. Long, Harbeson Hickman, E. W. Tunnell, G. W. Carrington, George W. Purnell, Geo. W. Bishop, E. K. Wilson, E. W. Houston. The officers are: Thomas Groom, superintendent, D. H. Houston, treasurer, H. S. Marshall, auditor, John L. Mapes, engineer of roads and bridges, and A. Brown, traffic agent. The office of the company will be at Georgetown, Del. The lines, which run in and through four Peninsular counties, have an aggregate length of 101 miles, the Junction and Breakwater, including the branch to Lewes and Rehoboth, being 45 miles, the Breakwater and Frankford 20 miles, and the Worcester 36 miles.

THERE were filed at Harrisburg, Penn., on the 1st inst., articles of merger and consolidation between the Philadelphia, Norristown and Phœnixville, the Phœnixville, Pottstown and Reading, and the Phœnixville and West Chester Railroad Companies, extending from Philadelphia to Reading, under the control of the Pennsylvania Railroad Company, and to be known as the Pennsylvania Schuylkill Valley Railroad Company. The capital stock is $4,500,000. J. N. DuBarry is president of the consolidated company.

ORGANIZATION.

AT the annual meeting of the stockholders of the Northern (N. H.) Railroad Company, held on the 31st ult., the following directors were re-elected for the ensuing year: Henry C. Sherburne of Concord, George W. Nesmith of Franklin, Uriel Crocker of Boston, Francis B. Hayes of Boston, Josiah H. Benton, Jr., of Boston, George E. Todd of Concord, Alvan W. Sulloway of Franklin. Uriel Crocker of Boston, Wyman Pettee of Enfield and Wm. P. Wilson of Lexington were appointed auditing committee for 1884. The directors organized by choosing Henry C. Sherburne president, and William L. Foster clerk.

THE directors of the Montpelier and Wells River Railroad Company, elected on the 31st ult., are: D. R. Sortwell, Cambridge, Mass.; S. S. Thompson, Lyndonville, Vt.; W. H. H. Bingham, Stowe, Vt.; Joel Foster, Montpelier; S. C. Shurtleff, Montpelier. The officers are: D. R. Sortwell president, S. S. Thompson vice-president, Joel Foster clerk, Fred. W. Morse general passenger agent and treasurer, W. A. Stowell general superintendent, S. C. Shurtleff attorney.

THE directors of the Pacific Mail Steamship Company, elected on the 30th ult., are: Jay Gould, Sidney Dillon, Russell Sage, C. P. Huntington, E. H. Perkins, Jr., Henry Hart, William Remsen, Edward Lauterbach, J. B. Houston. The officers are: President, J. B. Houston; secretary, W. H. Lane; treasurer, J. Hellen. Executive committee, Jay Gould, Russell Sage, C. P. Huntington, Henry Hart. Auditing committe, Sidney Dillon, E. Lauterbach, Wm. Remsen.

AT the first annual meeting of the Canada Rolling Stock Company, recently held in St. John, the following directors and officers were elected: Robt. Thomson, of Stratford, Ontario, president; Robt. Marshall managing director and treasurer; Magnus Sabiston, Jas. Alfred Clark and James Rourke, directors; Robt. Marshall secretary. The capital stock of the company is increased from $80,000 to $450,000.

AT the annual meeting of the Manchester and Lawrence Railroad Company, held Manchester, N. H., on the 25th ult., the following directors were elected: Benjamin F. Martin, Nathan Parker, Manchester; Asa Fowler, Edward A. Abbott, John A. White, Concord; Jos. W. Smith, Andover, Mass.; Wm. A. Tower, Boston. The directors elected Benjamin F. Martin president, and Samuel N. Bell clerk.

AT a meeting of the stockholders of the Nashua and Lowell Railroad Company, on the 30th ult., the following board of directors was elected: Francis A. Brooks, Francis E. Parker, Sidney K. Richardson of Boston; H. M. Shaw of Lebanon; J. W. White, C. V. Dearborn, W. W. Bailey of Nashua; Charles B. Brooks of Boston, treasurer; W. A. Lovering of Nashua, clerk.

THE officers of the Railway Car Accountants' Association, recently elected, are: Asa P. Blakeslee of the Lehigh Valley Railroad, president; W. A. Moody of the Richmond and Danville Railroad, vice-president; F. M. Luce of the Chicago and Northwestern Railroad, secretary, and H. H. Lyon of the Chicago and Alton Railroad, assistant secretary.

THE directors of the United Railroad and Canal Company of New Jersey, elected on the 31st ult., are: John Jacob Astor, John C. Banon, Joseph D. Bedle, William Bucknell, A. L. Dennis, Charles E. Green, F. W. Jackson, Robert Lenox Kennedy, Thos. McKean, John G. Stevens, R. F. Stockton and Samuel Welsh.

THE directors of the West Jersey Marl and Transportation Company, elected on the 30th ult., are: John G. Stevens, George M. Wright, Thomas J. Yorke, R. C. Nichols, William E. Potter, T. U. Harris and Thomas N. Adams. T. U. Harris was elected president and J. C. Voorhees secretary.

THE directors of the Wilton Railroad Company, elected on the 30th ult., are: Solomon Spalding, Clark C. Boutwell, William T. Ramsdell, John Reed, John A. Spalding of Nashua; Harvey A. Whiting of Wilton, clerk; Frank A. McKean, treasurer.

CONSTRUCTION.

PRESIDENT GOWEN of the Philadelphia and Reading Railroad Company, is reported to have said that the Jersey Shore, Pine Creek and Buffalo Railroad would be opened for business by the 18th of June. The new Clearfield road is to be opened some time during the coming winter, and the Vanderbilt line to Pittsburgh will be completed within two years. The Baltimore and Ohio's new line between Philadelphia and Baltimore, it is expected, will be completed within sixteen or eighteen months.

THE General Passenger Agents of the East Tennessee, Virginia and Georgia and the Louisville and Nashville Railroad companies announce the completion and opening of the Short Line between Louisville, Ky., and Knoxville, Tenn., composed of the Louisville and Nashville Railroad, Louisville to Jellico (Kentucky State Line), 201 miles, and the East Tennessee, Virginia and Georgia Railroad, Jellico to Knoxville, 66 miles, shortening the distance between Louisville and Knoxville 157 miles.

THE Oregon Short Line Railway has been completed to a point twenty-two and one-half miles west of Shoshone. The distance from Granger on the line of the Union Pacific to Shoshone is 322 miles. In addition, a branch fifty-seven miles long, from Shoshone to Hailey, on the Wood River, is in operation. The Short Line will be completed through a connection with the Oregon Railway at Snake River by the 1st of January.

THE survey of the Sussex (Del.) Midland Railroad, the charter for which has passed into the hands of Jerome Bradley, of New York, was commenced on the 4th inst. The road is to be completed from Georgetown to Bridgeville within a year. The starting point at Georgetown is about a fourth of a mile north of the depot of the Delaware, Maryland and Virginia Railroad.

THE Arizona Mineral Belt Railroad, a Boston enterprise, is being surveyed from Winslow, on the Atlantic and Pacific Railway, to Globe City, Ari., with the view of ultimate extension to the junction with the Southern Pacific at Benson. The road, it is believed, will be an available feeder to the Atlantic and Pacific.

THE Chicago, Milwaukee and St. Paul Railway Company has decided to build a line into Kansas City. It will go from Ottuma via the Chillicothe route, the company building a bridge over the Missouri above Wyandotte. The road will be in operation by the first of the year after next.

CONSIDERABLE progress is being made in the surveys of the Ottawa, Waddington and New York Railway. The company intend bridging the Ottawa River at the lower end of the city of Ottawa, connecting with the Canadian Pacific and the proposed Gatineau Valley Railway at Hull.

THE two ends of the Nicholson tunnel on the Delaware, Lackawanna and Western Railroad, near Factoryville, Penn., have been connected. The completion of the tunnel removes the last barrier to a double track on the Delaware and Lackawanna Railroad between New York and Buffalo.

THE line of the Natchez and Northwestern Railroad Company, which is asking local aid from the parishes on the line in Louisiana and the counties in Arkansas, extends from the Mississippi River, opposite Natchez, to Pine Bluff, Ark. It is to be a narrow-gauge road.

THE President has accepted the twenty-five miles of the Northern Pacific Railroad, recently constructed, and examined by a special commission. The section accepted extends from the 325th to the 350th mile east of Wallula Junction, Washington Territory.

THE New Brunswick Railway Company, which has obtained a 999 years' lease of the St. John and Marine Railway, will take possession on the 1st of July. It is said the company expect to extend the line from Edmonton to River Ouille this year.

THE Baltimore and Potomac Railroad now has a double-track all the way from Baltimore to Washington, and trains are now run through from Philadelphia to Washington without changing crew or engine.

TRACK-LAYING was commenced on the 31st ult., on the Live Oak, Tampa and Charlotte Harbor Railroad, which will extend from Branford to Charlotte Harbor, Florida.

THE Wisconsin Central Railroad Company is making preparations to complete the extension of the road from Chippewa Falls, Wis., to St. Paul this season.

MINOR KEITH has presented a proposition to the Costa Rica Congress to continue the Simon Bay and Rio Lucio Railroad to the capital, San Josét.

THE extension of the St. Paul, Minneapolis and Manitoba railroad, from Bartlett to Creel City, is to be finished by July 1, and opened on July 4.

THE work on the Russellville and Dardanelle (Ark.) Railroad is progressing rapidly. The managers hope to finish grading by the 1st of August.

THE contractors are hard at work completing the section of the Quebec and Lake St. John Railway, from St. Raymond to Lake Simon.

THE Jacksonville, St. Augustine and Halifax River Railroad was completed to St. Augustine, Florida, on the 19th of May.

THE New York Central Railroad between Rochester and Suspension Bridge is to be double-tracked.

INCORPORATION.

ARTICLES of incorporation were filed on the 1st inst. with the Secretary of State at Albany, of the Brooklyn and Long Island Trunk Railroad Company, with a capital of $5,000,000. The incorporators are: Austin Corbin, Islip, L. I.; J. Rogers Maxwell, Brooklyn; Henry W. Maxwell, Brooklyn; Henry Graves, Orange, N. J.; E. B. Hinsdale, New York; James D. Campbell, Davenport, Iowa; Edward E. Sprague, Flushing, L. I.; Edwin H. Atkins, Brooklyn; W. T. Wild, Jersey City; J. K. O. Sherwood, Glen Cove, L. I.; Thomas F. Wood, New York; W. G. Wheeler, New York; and Charles Bruff, Brooklyn. The company was subsequently organized by the election of Austin Corbin president, Anthony Jones engineer, and the following board of directors: Austin Corbin, J. Rogers Maxwell, Henry W. Maxwell, Thomas F. Wood, J. D. Campbell, J. K. O. Sherwood, Charles Bruff, E. B. Hinsdale, and W. G. Wheeler. A map and profile of the proposed route of this road was filed in the office of the Register of Kings County on the 2d inst. The route is described as follows: Beginning at the depot grounds which extend from High to Nassau street, and from Washington street to Snell's alley, it will curve from Nassau street toward Washington street, which it crosses about half way between Nassau and Concord streets. It crosses Concord street about one-third of the block east of Washington street, and crosses Adams street half way between Concord and Tillary streets. It crosses the junctions of Tillary and Pearl streets, Jay and Johnson streets, and Myrtle avenue and Lawrence street, taking off the four corners at each junction. Bridge street is crossed about two-fifths of the block from Willoughby street, and the latter street is crossed where it intersects Duffield street. Gold street is crossed half way between Willoughby street and DeKalb avenue. The route crosses Prince street at its junction with Fleet street and DeKalb avenue, near Debevoise Place, and then runs across Fulton street at Nevins street and into Flatbush avenue, through which it runs to the depot of the Long Island Railroad and through Atlantic avenue to the county line. Mr. Corbin says that he purposes to run his cars across the Bridge, using the endless cables, and then by the elevated roads in this city to Harlem. The estimated cost is $1,000,000 a mile. The land, 60 feet wide, is to be condemned and taken under the General Railroad Law. The road is to be an elevated one.

A CHARTER has been granted by the British Columbia Parliament to the Columbia and Kootenay Company for the purpose of building a railroad from Kootenay Lake to the Columbia River, near the mouth of the Kootenay River; also to run steamboats on the Columbia between the terminus of its railroad and the crossing of the Canadian Pacific near Eagle Pass.

THE Cambridge and Seaford (late Dorchester and Delaware) Railroad Company has been organized with a capital of $500,000. The road extends from near Oak Grove, Del., to Cambridge, Md., 27.28 miles, and is a branch of the Delaware Railroad. A controlling interest is owned by the Philadelphia, Wilmington and Baltimore Railroad Company.

A BILL has passed the House of Representatives of Rhode Island incorporating the Olmstead Air Line, or New York and Boston Shore Line Railway Company, with authority to purchase or lease the Boston and Providence Railroad. Its route from New York is via New Haven and Norwich to Providence and thence to Boston.

THE Cleveland Railroad Construction Company, of Cleveland, Ohio, has been incorporated with a capital stock of $560,000.

PERSONAL.

S. D. REEVES has received the appointment of superintendent of the St. Louis and Kansas City Divisions of the Chicago and Alton Railroad, with headquarters at Rood House, Ill., in place of T. M. Bates, promoted to the position of superintendent of transportation. W. E. Gray has been appointed assistant superintendent of the Kansas City Division of the same road, with office at Slater, Mo.

L. H. ROBINSON, of Milford, Pike County, Penn., has been chosen a director of the Philadelphia and Reading Railroad Company, vice Eckley B. Coxe, resigned. It is said that Mr. Robinson will represent the Vanderbilt interest.

ALEX. BRENDSON, of Philadelphia, has been elected president of the West Virginia Central Railway Company. The president and secretary are authorized to take necessary action in commencing operations upon the road.

A. B. BARNARD has been appointed supply agent of the Kansas City, St. Joseph and Council Bluffs Road, with headquarters at St. Joseph, Mo., and he will have charge of all material and supplies, and their distribution.

J. C. WILLIAMS has been appointed general superintendent of the Chicago and Atlantic Railroad, with headquarters at Chicago, Ill. The duties of chief engineer of this company devolve upon Samuel H. Doty.

T. W. SPENCER, engineer of the Rochester Division of the New York, West Shore and Buffalo Railroad, has been appointed chief engineer of the State Railroad Commissioners.

WILLIAM IRVING has been appointed general purchasing agent of the Chicago, Burlington and Quincy Railroad Company, with headquarters at Chicago.

JOHN ORTTON has been appointed master mechanic of the Eastern Division of the New York Central Railroad, with headquarters at Albany.

B. D. WEBBER has been appointed freight agent for New England, of the Quebec, Ottawa and New England Air Line Railway Company.

EDWARD B. WALL has been appointed superintendent of motive power of the Pittsburgh, Cincinnati and St. Louis Railway.

C. H. GLASS has been appointed auditor of the Pittsburgh Division of the Baltimore and Ohio Railroad Company.

E. H. HARRIMAN, of New York, has been elected a director of the Illinois Central Railroad Company, vice A. G. Dalman.

J. VOLK, has been appointed superintendent of construction of the Oregon and California Extension of the Northern Pacific Railroad.

W. R. BAKER has been appointed general superintendent of the Manitoba and Northwestern Railway.

H. N. TURNER has been appointed general freight agent of the Boston and Lowell Railroad Company.

ALBERT KLINE has been appointed auditor of the Pittsburgh and Western Railroad Company.

GABRIELLE GUSTAV VALENTINE, a noted German physiologist, is dead.

FOR the past three months the Pennsylvania Steel Company has been making arrangements with its old two-converter plant at the works near Harrisburg, Pa., to thoroughly test the value of the Thomas-Gilchrist process for the manufacture of steel, otherwise known as the basic steel. The samples of the basic steel that were tested gave results that were exceedingly satisfactory, and the steel was shown to be equal and, in a number of respects, superior to the steel previously made at the works by the Bessemer process.—*Pat. Office News.*

CORRESPONDENCE.

[COMMUNICATIONS are solicited for this department on all subjects pertaining to Railroads, Steam Navigation, Machinery, Manufactures, etc. No attention will be paid to communications unless the name and address of the writer is furnished us, though if desired, they will be withheld from publication. We assume no responsibility for statements made by correspondents, and we do not necessarily endorse ideas advanced by them. Under these conditions we think it of value to our readers to devote a liberal space to the free discussion by others—whose opinions may be at variance with our own—of subjects pertinent to this department of the AMERICAN RAILROAD JOURNAL.]

Editor American Railroad Journal:

THE Montreal *Gazette* of May 18th, contains an account of a trip of a freight train on the Canada Atlantic Railway, from Ottawa to Coteau. The account stated that the load consisted of 450 net tons of line freight hauled by a single locomotive with cylinders 16x24, against grades of thirty feet per mile.

This was such an unusual performance that I have made further inquiries about it, and I find, to my surprise, that it was even better than described. It appears that the train consisted of forty cars, and the gross weight of the train, exclusive of the engine, was 792 net tons. This was of course an unusual performance, but the most surprising feature of it was not mentioned by the reporter of the *Gazette*. It seems that this train was hauled over an undulating country, from Alexandria to St. Polycarpe, a distance of nineteen miles, in fifty-five minutes, including one stop of several minutes at an intermediate station; certainly this was a remarkable performance.

The writer in the *Gazette* seems to attribute the result mainly to the constructive ability of the engineer and contractor, Mr. D. C. Linsley. As to Mr. Linsley's skill and ability as a railway engineer, we presume there is but one opinion. Certainly we are quite willing to concede all that his warmest friends may claim in this regard, and are equally willing to believe that he has constructed the Canada Atlantic Railway in a thoroughly first-class manner as is stated. Yet after all, we incline to think a good portion of the success of the experiment must have been due to the locomotive that did the work. The description of this is meager and unsatisfactory. Full details of its construction would be of much interest to all builders and users of such machinery, the more especially that it is described as of somewhat peculiar construction.

Will not some of the parties possessed of the information let us have it through your columns.

E. H.

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MR. JAMES J. WHITE, Ottawa, Canada, writer of "Our Canadian Letter," acts as agent for the AMERICAN RAILROAD JOURNAL in Canada. He is authorized to receive, in behalf of the company, subscriptions and advertisements for this journal; also news of the character which he can utilize in the preparation of his Letter, or send to us for use elsewhere within these columns. He respectfully invites information concerning Railroad matters generally, Mining, Banking, Finance and Manufactures.

WE invite railroad officers to send us notice of elections, transfers, appointments, resignations, etc.; and all our readers would oblige us by furnishing us with any items of news which may come to their knowledge and are of a suitable nature for our columns. It is our intention to publish monthly full and accurate information regarding those enterprises and industries to which the AMERICAN RAILROAD JOURNAL is devoted, and to effect this end we solicit the co-operation of readers interested therein. We aim specially to record all new railway enterprises in the United States and Canada, and to note the progress of construction on all new roads and extensions; and we request those concerned in railway building to give us early information concerning the above, that our reports may be as complete as possible.

NEW YORK, JUNE, 1883.

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LEASE OF THE CENTRAL RAILROAD OF NEW JERSEY TO THE PHILADELPHIA AND READING RAILROAD COMPANY.

THE most important event in railroad circles of recent occurence, is the restoration to the hands of the stockholders, from the hands of a Receiver, of the Central Railroad of New Jersey. This event has been hastened, perhaps a year or two, by the desire of the Philadelphia and Reading Railroad Company to secure the use of this line by a perpetual lease. The majority interest in the stock passed some time ago into the hands of parties owning and controlling the Philadelphia and Reading and the Baltimore and Ohio railroads. It is to be understood, however, that among the former is Mr. W. H. VANDERBILT, who has come to the help of Mr. F. B. GOWEN, president of the Philadelphia and Reading, in order to assist him to secure control; and without whose assistance there is reason to believe the road would have passed into other hands—the Pennsylvania Railroad Company. Mr. VANDERBILT, in investing in the stock of the Central Railroad Company of New Jersey, had objects of his own; first, to revenge himself upon the Delaware, Lackawanna and Western Railroad Company, which recently opened a competing line and took away its anthracite coal tonnage going to the upper lakes; and second, to hold in check the growing aggressiveness of the Pennsylvania Railroad Company, which is a competitor of its system, both at New York and at all points west of the Alleghany Mountains.

Mr. JOHN W. GARRETT'S objects in investing in the stock of the Central Railroad Company of New Jersey are quite obvious. He desires to throw off his dependence upon the Pennsylvania Railroad Company for transit between Baltimore and New York City. The Baltimore and Ohio Railroad Company, of which he is president, aspires to become a trunk line to the three great seaboard cities, with ramifying connections to the five or six great cities in the Mississippi Valley. The Philadelphia and Reading and the Central of New Jersey together furnish the ninety mile link between New York and Philadelphia—by far the most costly and difficult portion of the whole, while the Philadelphia and Reading has a fork extending to Wilmington, which leaves less than sixty miles north of Baltimore to be constructed, to establish a through line. This can be done very rapidly, and by the expiration of another year we may look to see the through trains of the Baltimore and Ohio Railroad running continuously from Chicago and St. Louis to the banks of the Hudson River at Jersey City.

Mr. GOWEN'S ambition and motive for investing in the stock of the Central Railroad Company of New Jersey is also two-fold: first, the long truce between the Philadelphia and Reading and the Pennsylvania railroads has been so strained that its usefulness has come to an end, and chronic war between these rival interests may be expected to take place. The Pennsylvania Railroad desires to penetrate the Schuykill Valley, and tap the business heretofore exclusively enjoyed by the Philadelphia and Reading. On the other hand, the Philadelphia and Reading, so long halted at Harrisburg, aspires to build westward to Pittsburgh and the famous Connellsville coke region. At Pittsburgh it will be joined by the road recently completed from Pittsburgh to Lake Erie, owned in the Vanderbilt interest. It will be within

150 miles of the "Bloomington" and other independent roads through Ohio and Indiana. Second, since the lease of the North Pennsylvania Railroad and its Bound Brook extension, the through line between New York and Philadelphia has made an inroad upon the Pennsylvania's exclusive monopoly between the two great cities; and although traffic agreements have held up the rates, it would be very important to the Pennsylvania Railroad to secure control of the Bound Brook route also. This Mr. GOWEN has prevented. The result will be parallel lines from New York to Philadelphia and Baltimore, as there are already between Baltimore and Washington, which is a serious blow at the Pennsylvania Railroad. That company has, however, the most complete and efficient organization in the United States, and hitherto has easily kept the lead in all those qualities which go to make up a perfect transportation system; and it is by no means destroyed, although somewhat injured by the present plans.

The peculiar significance of the Philadelphia and Reading's entrance to New York harbor lies in the fact that the Central of New Jersey has the most extensive and valuable water-front of any of the lines reaching New York—about 500 acres, fronting the lower part of the metropolis (most of it made land, filled in with the debris and sweepings of New York)—which furnishes the most convenient and accessible ground for warehouses, docks, wharves, and for tracks. There is no other spot of ground so available, fronting on deep water. It cannot be reproduced, and its money value can hardly be estimated. This is the great obstacle to building other and new Trunk lines from New York to the West. Access to the water front, where ship and car can be brought together, is and must be so expensive that for a long time to come it will be a serious obstacle to building; the New York, West Shore and Buffalo Railroad Company having secured wharves close under the Palisades, and the intermediate distance being covered by the Delaware, Lackawanna and Western, the New York, Lake Erie and Western, and the Pennsylvania Railroads. There remains only Staten Island and the Standard Oil Company's property at Bayonne available as terminal grounds for railroads.

The Central of New Jersey has, moreover, a good business of its own. It is, and has been for years, one of the largest coal carriers; its coal tonnage running up from three to five millions per annum, and the profits upon this can hardly be rated at less than one dollar per ton, average. This, of itself, makes it a desirable acquisition for the Philadelphia and Reading. It has also a very extensive local patronage by persons who do business in New York, and live in the string of suburbs along its line for the first thirty-five miles. It has, moreover, a Newark Branch which must be operated at a handsome profit. The Jersey seashore branch is fast becoming a remunerative investment, so much so that the Pennsylvania Railroad Company insisted upon a share of that patronage. Under the receivership of Judge LATHROP, an arrangement was entered into whereby the track from Woodbridge to Long Branch was to be used jointly, and the trains so arranged as to divide the business; the Pennsylvania Railroad Company managing to secure the greater part.

From present appearances, therefore, it would seem as if the Central of New Jersey would become the pipe end of the funnel, through which trains will be passing southward to the Jersey shore, and to Philadelphia, Baltimore and Washington; Westward to the coal fields—to Harrisburg and Pittsburgh; and northward by way of the Lehigh Valley, to Lake Ontario and Buffalo. It is understood that the receiver is to retain in his hands a sufficient amount of securities held by the company, with an addition to be made over to him by the intending lessee, equal to about $2,050,000 for the purpose of liquidating that amount of floating debt, as it may mature. The lease has been executed and ratified, and goes into effect at once. It is understood that its terms are a guarantee of six per cent. dividends upon the stock, payable quarterly from and after the 1st of September next. Speculators are asking what is the value of the guarantee of a company which has hard work to keep itself from the Receiver's hands. It is quite clear that for the first year, at least, the road will not earn the amount of this dividend; but inasmuch as the Philadelphia and Reading and its associates are to secure other collateral advantages by making the lease, it is not unreasonable that it should pay something for the control. At the same time, it is apparent that if the Central of New Jersey did not earn in the past year, 1882, with an enormous output of coal and good general business, enough to pay interest and fixed charges as they will stand in 1883 and 1884, it is difficult to see wherefrom it can do so with the declining activity before us. But in any event, the contemplated lease is quite as advantageous an arrangement as the lease by the Pennsylvania Railroad Company of the United Railroads of New Jersey for 999 years, which required that in order to control the ninety miles of road between New York and Philadelphia, the lessee should assume the debt on 400 miles of road and a canal beside, and then pay ten per cent dividends on the stock.

PASSENGER TARIFF.

WHEN we wrote the former article with the above caption, for the last number of the JOURNAL, we thought we had done with the subject. We wrote it in the regular order of subjects that come up for discussion in these pages, and did not expect to hear from it in any way or from any source. We naturally supposed that the readers of the JOURNAL would recognize the truths there set forth, and possibly that some roads might make an effort toward a reduction of fares for daily travelers. We had no idea, however, that we were so clearly voicing that which our readers were silently thinking.

But since the last number of the JOURNAL made its appearance, we have been approached by residents of Passaic, and have had numerous conversations with them on this subject, in the course of which we have received additional ideas, which may be of interest to the railroads and which we think, if carried into effect, will doubtless prove profitable to them.

It is a well-known fact that men doing business in New York City must either cross a ferry or go to Forty-second street, which is a long distance from the City Hall, to take a train. It is also a well-known fact that the Erie Railway has a large tract of territory to pass over, from its depot in Jersey City, before it can reach ground which is capable of being utilized for building sites. The time may come when the marshes between Jersey

City and Rutherford may be reclaimed and placed in a habitable condition, but that time is not yet.

Rutherford, being the first station of any note on the Erie Railway, bears the same relation to that road which a station three miles from the terminus of some other road bears to it. The residents are not to blame for the marshes any more than the railroad is, and the fact that the trains do not have to stop, except voluntarily, should be taken into consideration by the managers, and a passenger tariff made which would prove satisfactory to all concerned.

Now there is no question whatever, in the minds of intelligent men, but what the single fare of forty cents from New York to Passaic is altogether too high, and rather prevents parties searching for homes in that vicinity from locating there. The same may be urged against the fare of thirty cents to Rutherford and of fifty cents to Paterson. It will be claimed, however, by the road that parties can buy an excursion ticket to Rutherford for forty cents, to Passaic for fifty-five cents, and to Paterson for seventy cents, which enables the seeker for a home to go and return for nearly the same as a local fare. But, when it is taken into consideration that a man does not select a home on his first trip, but generally makes several trips before deciding, it naturally follows that, as his car fares multiply, he becomes discouraged and abandons that locality for one which he can reach for less money.

One of the prime factors in the success of a railroad is its local travel. To procure local travel, it is necessary that on the line of every railway there shall be thriving villages, towns and cities. It behooves the managers of railways, then, to do all that is possible to make these places thriving, not alone by building tasty depots and keeping the grounds around them in good condition, but by making a passenger tariff that will invite travel instead of restricting it.

Take the trunk lines: On the long distances, they recognize the fact that, if they are to have passengers, they must place their rates within the reach of the would-be passengers' purses, or else some other road will underbid them and secure the bulk of the travel. This holds true, except during those periods when the roads form a pool and all charge the same prices for their tickets; even then some one road, sharper than the others, will have scalpers to sell tickets, over their lines, at cut rates.

Another thing is noticeable; on through trains the different roads are particular to have the best car accommodations, and the finest rolling-stock, while, apparently, anything is good enough for the local trains; and some of the cars running over the Erie Railway to Paterson would prove a disgrace to anything which pretended to be better than a coal train.

Now that the bridge is finished to Brooklyn and the elevated roads have made Harlem and Morrisania accessible, and the New York City and Northern road can carry passengers from South Ferry to South Yonkers in fifty-five minutes, and the prospect is good for an underground road under Broadway—the question becomes interesting—what is to be the value of New Jersey property within twelve miles of Jersey City, and what are to be the earnings of the roads running out of Jersey City, unless some action is taken on the part of the railway managers to cater to the public wants?

A passenger can leave South Ferry during commission hours and ride to one hundred and fifty-fifth street for five cents, and the railways running from Jersey City, having the disadvantage of a ferry between Jersey City and New York, ought to be able to carry passengers the same distance for the same money. The argument may be brought up by the railroads that they do not have the number of passengers carried by the elevated roads and, therefore, cannot be expected to carry them as cheaply, which argument is, to a certain extent true, but can be set aside by considering the number of times a single passenger would ride if the fare were reasonable.

An esteemed correspondent writes, "I take the ground that all surface railroads can *better* afford to carry passengers the same distance for ten cents per trip than the elevated roads can. In the first place the surface roads did not cost as much to build (as represented by the bonds and stocks), therefore they do not have to earn as much money to pay interest on bonds and dividend on stock. In the second place, the elevated roads are required to run from 5:30 to 8:30 A. M. and from 4:30 to 7:30 P. M. at five cents a trip, and it is safe to say that the bulk of the travel avail themselves of these hours. 3d. The elevated roads carry no express or freight, which prove very profitable to the surface roads. If the surface roads say they cannot make money at reduced fares, let them satisfy the public by trying it one year, and then give the result in a sworn statement."

If the Erie Railway would sell ten tickets for a dollar to Rutherford, West Rutherford, Passaic Bridge, Prospect St., Passaic, Harrison St., Clifton, Lake View and Paterson on their main line, and for the stations between Jersey City and Paterson on their Newark Branch, the residents of these different places would travel over the road a great deal oftener than they do, and it seems to this Journal that the road would make a great deal more money than at the present tariff.

As the tariff stands to-day, a resident of Passaic buys his commutation ticket and rides in and out once a day. For the sake of saving fifty-five cents, the price of an excursion ticket, or the necessity of buying a mileage ticket and the payment of twenty dollars at one time, he will try to do his wife's shopping and procure articles wanted by his family, instead of his wife or the members of his family doing it for themselves. On the other hand, if ten tickets could be bought for a dollar, he would not hesitate to lay in one, five or ten dollars' worth of tickets at a purchase, which would be put into the family box, and any time the family needed anything, any member of it would not hesitate to go to New York, instead of burdening the head of the family.

It is time for railways to recognize the rights of passengers in order to promote their own welfare and prosperity, and this can be done—not by the manipulation of its securities on the Stock Exchange—but by meeting the necessities of the case, in the transportation of passengers and the carrying of freight.

Our roads have been more damaged than helped by the Stock Exchange, because while a few sharp men have been enabled to grow wealthy, the roads have not grown prosperous, because the efforts put on the Stock Exchange to manipulate the stock have not been put into the management of the road and the running of its daily trains. It seems to us as if the time had come when

that road which first recognizes the rights of passengers will be the most successful in building up villages and towns on its line and thus increasing its passenger travel and the quantity of freight it will carry. There is no reason why the present system of commutation tickets should not be abolished. No railroad has any right to make its passengers police officers, watching the conductor and the ticket agent. No business man thinks of making the purchaser of his goods a guardian to keep the employés of the seller honest, and so no railway management ought to take the thousands of passengers traveling over the road, and place them in the position where they stand between the company and its officers to prevent the stealing of fares. A season ticket should be issued to the passenger for a specified time, good for any number of rides that he may choose to take.

Now, these thoughts and the thoughts expressed in the former article can be summed up as follows:—First—The railroads running out of Jersey City must see to it that their rolling-stock on local trains is as good and comfortable as the rolling-stock of through trains. Second: They must be as careful to run their local trains on schedule time as they are to run their through trains. Third: Their passenger tariff must be just as favorable for local traffic as it is for through traffic. Fourth: Instead of issuing commutation tickets for a certain number of rides, to be taken in a certain specified time, they must issue season tickets, good for any number of rides in the specified time. Fifth: In order to build up the villages and towns along the line of their road, they must offer some inducements in the shape of free transportation for a certain specified time, according to the value of the house erected.

The road adopting the above measures and broadly proclaiming them, will be the road along whose line parties will choose to settle, and such road will be prosperous—not from any manipulation by its managers on the Stock Exchange, but from a healthy, legitimate growth, which will not be subject to the fluctuations indicated by the ticker. Passengers are the most profitable freight the road carries because they load and unload themselves.

THE CHICAGO EXPOSITION.

THESE remarks are written when the flow of visitors to the National Exposition of Railway Appliances is approaching its height. Glorious summer weather invites to travel, and the normal self-complacence and importance of the commercial center of Illinois are being gratified to an extent which taxes severely the far-famed eloquence of its chroniclers. The choice of Chicago as the scene of an unprecedented exhibit of railway appliances is unquestionably a wise one. No city in the Union offers equal facilities for this purpose, and the event in progress is the most pleasingly important in its eventful history thus far.

It is noteworthy that the opening of the Exposition was contemporary with that of the bridge spanning the waterway between New York and Brooklyn. While this structure represents the best results of modern engineering, the exhibition presents a history of railroad development, which in its progress has given that experience in bridge-making which has made the Brooklyn Bridge a leading fact in the story of the conflict between the ingenuity of man and the difficulties presented by Nature.

The generalities of the press evolved by the Exposition, seem to pretty well cover the ground, but it, perhaps, remains to be said that the invention of the locomotive is the greatest event in the industrial history of the world. That quaint old engine, "No. 1," sent to Chicago from England, and the observed of all observers there, was the pioneer of the most comprehensive and potent change in human affairs as yet given old Father Time to set down in his teeming records.

The electrical train, running constantly its round of duty on the Exposition premises, is an embodied prophecy. It dates more than half a century ahead of "No. 1." The hoary visitor to an exposition of railway appliances in the year 1930, will, it is to be hoped, be enabled to compare the present stage of industrial development with that of his own age, among other ways by witnessing its operations. Many, we trust, who see these now, will be present to make the comparison, and of them a large proportion of hoary-headed persons who will refer with the proud garrulity of old age to the visit they made to Chicago in the year of grace 1883, and when they were in the employment of a railroad company.

THE Young Men's Christian Association, of Springfield, Mass., sets an example worthy to be followed by other organizations of the kind, in its operating a railroad branch institution, which is well supplied with daily, weekly and monthly publications, and has an amusement room, wash-room, hall for social gatherings, and supplies of stationery for members, religious services, entertainments, concerts, lectures, etc. A good library, now in process of collection, is among the other attractions offered by this useful institution. The work of the branch is sustained by the Boston and Albany Railroad, New York, New Haven and Hartford Railroad, Connecticut River Railroad, Wason Manufacturing Company, many citizens of Springfield and by the sustaining members. Any railroad man, by the payment of twenty-five cents per month, becomes a sustaining member, and every railroad man is cordially invited to join and share in the full benefits of the Association, and aid in its support. In these times, when such crotchety persons as condemn an organization without reserve, because, forsooth, they fail to find some feature about it upon which they set great store, or for some other equally inadequate reason, are wasting words in attacks on Young Men's Christian Associations and similar bodies, it is well to state the good things being done by the Railroad Branch of the Young Men's Christian Association of Springfield, Mass., as a sample of what thousands of similar organizations are doing. The croaker should find matter in the recital to abash and silence him.

WE hope and believe that the remarks on color blindness in railway employés, printed elsewhere in this issue, will be read and considered with the thoroughness due to the importance of the subject upon which they treat. Their author is no mere crotchet-monger, and his views should command the greatest attention from the companies which, in these days of travel, have the safety and lives of their fellow-citizens very much in their keeping. As we said before, we have no fear but that DR. JEFFRIES will be fairly treated by his readers. The operators of

railroads are naturally more concerned than any other class, out of regard for their own interest as well as for other reasons, to provide in any way practicable for the safety of their passengers. If, as our learned writer seems to think, the tests as now used are not adequate to the detection of color-blindness and otherwise defective vision in railroad employés and candidates for employment, the interest of railroad companies lies in a proper and more thorough application of them by perfectly competent persons.

A TERTIO-MILLENNIAL Anniversary Celebration and Grand Mining and Industrial Exposition are announced to take place at Santa Fé, New Mexico, opening July 2, and closing August 3, next. A programme of formidable length accompanies the announcement. Speechifying, music, Indian games, Mexican games, horse-racing, balls, Indian war-dances, the presentation of historic scenes and histrionic entertainments are some features of the prolonged festival. The exposition of mining, manufacturing and other industries will occupy a main building 480 x 60 feet, with annexes. We hope "the affair" will prove a success. The novelty of a "tertio-millennial" jubilation and its being on a scale, especially of duration, worthy of its imposing denomination, recommend it to the attention of people at a distance as well as near the scene of the celebration, the meaning of which is that Santa Fé will be 333 years old at the time of its being held.

GREAT interest has been excited by the publication in these columns of DR. HERRICK'S papers on railway medical service. Their continuation will doubtless maintain the wholesome interchange of views on the important subject treated, which has succeeded the publication of articles from his able pen. As heretofore we place the space devoted to correspondence at the service of gentlemen who have something to say for or against or additional to the Doctor's remarks. Correspondents will kindly be as brief as they can in what they have to say. In this way variety and force, and consequent pleasure and gain to the reader, will be insured.

THAT street-below-a-street project known as the Broadway Arcade, of which we gave an account in our last issue, is more fully described in this. We refer the reader to the best and longest article on the subject yet published.

A FULL and comprehensive account of the Chicago Exposition of Railway Appliances will be published in our July issue, when this can be properly done as a review of a past event.

THE Souvenir for the spring of 1883 published by the Iron Publishing Company, Philadelphia, is No. 19 of Vol. XIX of *Iron*, a journal, like its subject, substantial and formed for durability. Whether or not the reader of *Iron* agrees with its views on protection, he cannot but be gratified at the array of industrial facts presented in its neat, business-like pages. We congratulate our useful contemporary on the evidences of prosperity which appear so strikingly in the "Souvenir," which, by the way, is radiant in a wrapper of beautiful and apt design, printed in colors.

SUBSCRIBE for the AMERICAN RAILROAD JOURNAL.

RAILROAD MEDICAL SERVICE.

(CONTINUED.)

BY S. S. HERRICK, M. D.

SECRETARY BOARD OF HEALTH, STATE OF LOUISIANA.

THE GERMAN EMPIRE.

HAVING made application to the Chancellor of the German Empire for specific information relative to the medical service existing upon its railways, I have been furnished with manuscript and printed documents bearing upon the subject, which form the basis of the present article. The regulations in force have neither been established by law nor by railroad officials, but "originated with the minister"; by which we may understand that an important government officer is clothed with extensive discretionary powers over the management of railways under a government eminently paternal, and quite appropriate to a country regarded by its people as their "fatherland."

Medical men are engaged for special districts by the railroad administration, under contract, of which a specimen copy has been furnished. This defines the precise boundaries of his district, and obligates him to render medical, surgical and obstetrical aid to railroad employés and their families, servants excepted. Laborers temporarily employed are also entitled to his services, when sick or injured within his territory, in case their removal to hospital be not actually necessary. The doctor is to be prompt in attending calls, and may be required to attend persons not belonging to his district, who are passing through it. He is to make monthly and annual reports to the Government Health Department, according to blank forms supplied. He promises to furnish all certificates concerning persons treated by him, which may be required by the management in the interest of the company. He is to designate an alternate physician, who will supply his place when sick or absent, and at his own expense. In addition to a certain stipulated compensation, the doctor has a free pass, in a second-class railway carriage, and is entitled to reimbursement for cost of private conveyance to a railroad patient off the line of road, when the distance is more than two kilometres. The contract runs for one year. Notice must be given beforehand, if the doctor desires to cancel it before expiration. The company reserves the right to cancel it summarily, for good cause.

All those in the service of the State railways are entitled to medical attendance and medicines, except bureau officials and those of high grade and salary. This privilege applies to every illness or injury without exception, and is enjoyed likewise by members of the family, but not by domestic servants.

In most cases the expense of this service is borne exclusively by the company; but in some it is defrayed from a relief fund, to which employés contribute.

Large cases of instruments and such surgical appliances as are needed for the treatment of injuries are kept at stations, whence they can be forwarded to the scene of an accident. Smaller outfits are carried on trains, for the use of the train attendants, previous to the arrival of the doctor.

Printed instructions are furnished to station-agents and train-conductors, for the general management of injured persons in the absence of a surgeon. These they are required to familiarize themselves with, and also with the application of bandages and simple dressings. Before me is a little pamphlet issued by the Bureau of Railroad Direction at Berlin, first in 1877 and again in 1881. It contains instructions for the immediate relief of persons injured by railroad accidents, or suddenly falling sick, before the arrival of the doctor.

The following is a brief synopsis of its contents. The larger cases of instruments are for the use of the surgeons only. The smaller ones are in charge of train-conductors or baggage-masters, or oldest brakemen as alternates. Not only must the station-

agent be familiar with the printed instructions, but he must see that some other attendant also is instructed, so as to act in case he is absent or disabled. These officials are to take charge of sick or injured persons until the arrival of the physician, and are required to exhibit such activity and presence of mind as to meet the exigency and prevent panic. They must receive instructions from the medical officers in the duties expected of them, and practice the application of simple dressings. Plain directions are given for the management of cases of fainting, unconsciousness and apparent death; for the arrest of hemorrhage; for the dressing of wounds; for the relief of coughing and vomiting of blood; for the treatment of blisters and excoriations, of sprains and dislocations; for the treatment of simple fractures, particularly of the arm and leg; also of compound fractures, involving the crushing or laceration of soft parts; for the treatment of burns; what to do on the return of consciousness to those injured; and lastly what must not be done. The pamphlet closes with catalogues of the contents of the larger and the smaller surgical cases.

No special railroad hospitals have been erected, for obvious reasons. The whole country is densely populated, and it is found more convenient and less expensive to make use of the general hospitals already established.

Provision is made by the different companies for the care of those permanently disabled through sickness or injury while in the discharge of duty. In case of death, provision is made for their families. Certain classes of employés are also entitled to retire upon a pension after service for a period not less than ten years. Their widows are also entitled to a pension, and their young children to an allowance for their rearing. There are besides benevolent associations among railroad employés, sustained by voluntary contributions, which afford relief to the sick and injured and aid to their widows.

Normal sight and hearing are positively required of those who fill certain positions, such as engineers, signal-men and conductors. Candidates for these positions are examined by railroad physicians, with special reference to color-blindness. After suffering typhoid fever, injuries to the head or severe shocks of any kind, the examination is renewed; and at regular periods of five years the examination is repeated. Dr. B. Joy Jeffries has shown that the examinations for color-blindness in Germany were very imperfectly made in 1877, the percentage of those found defective being generally much less than one per cent. Colored glasses, papers and lanterns were used, instead of the colored worsteds recommended by Prof Holmgren. Dr. Jeffries, however, believes that the examinations are now conducted more efficiently, by official order, but on this point I am not positively informed.

Inasmuch as the German railroad companies are obligated to provide for their employés in sickness and for their families after death, it would be very remarkable if their physical examination were confined to the senses of sight and hearing. It would appear that common prudence must dictate precautions for preventing those who labor under any defect of vital organs from becoming a charge upon the company, and likewise those who become disabled through their own vices. It has already been stated in these pages that employés on the railroads of Saxony are subjected to a searching physical examination, and I can not suppose that it would be limited to tests of sight and hearing in any part of the empire.

The extent of corporate liability is shown by a printed copy of a law promulgated in 1871 over the signatures of the Emperor William and of Bismarck, of which the following is a synopsis: Railroad companies are responsible for the death or bodily injury of individuals in their service, unless it can be shown that the same resulted from some providential dispensation or the direct fault of the sufferer. Compensation is decreed as follows: In case of death, the cost of medical attendance and burial. In case of total or partial disability for work, the allowance is to be proportionate; and his family, if he have any, have a corresponding claim for relief. In case of injury, indemnity shall cover the expense of surgical attendance and also loss of pay involved by inability to work. Whenever the sufferer is insured against accidents, and the company contributes a portion of the premium, this contribution shall be taken into account in settlement, unless it be less than one-third of the whole amount of premium paid. The company can not evade responsibility by any previous agreement with employés disclaiming such responsibility. All agreements contrary to the spirit of this are null and void. When both parties can not agree upon the amount of indemnity the Court will decide upon the extent of the injury and the disability, and will in general grant a fixed allowance. Under change of circumstances, the company can apply for stoppage or reduction of the allowance; or, on the other hand, the sufferer, within the prescribed period (hereafter named), may claim an increased allowance. In case the solvency of the responsible party be questionable, security for the fulfillment of the obligation may be demanded. The period of compensation is fixed at two years, beginning with the date of the accident, for the individual injured; and the same period for his family, counting from the day of his death. This law is not intended to supersede other laws which define corporate responsibility, as applied to different cases, and especially where the whole fault rests with the sufferer.

There are government regulations in force to prevent the infection of railroad cars by diseased animals, and to enforce cleanliness of the cars, The following is a synopsis of the imperial edict of 1876, relative to the disinfection of railroad cars used for transporting live stock: Cars used for carrying horses, mules, cattle, sheep, goats or hogs, must be thoroughly disinfected as soon as emptied. Also the pens, landing places, etc., whenever used, may be required to undergo disinfection. The duty of disinfecting cars falls upon the company within whose territory the same may be unloaded. Cars returning from a foreign country must be disinfected by the first company which receives them at the frontier. The "Bundesrath" is empowered to make exceptions to this last rule, upon suitable guarantee for their disinfection before return. The "Bundesrath" may also dispense with disinfection of stock-cars, used in inland traffic only, in localities which have been exempt for three months from pleuropneumonia and the foot-and-mouth disease of domestic animals. The penalty for neglect to carry out the above regulations, by those officials specially held responsible for the performance of the duty, is a fine not exceeding 1,000 marks ($250); and, in case a contagious disease is thereby propagated among animals, the penalty is a fine of 3,000 marks or imprisonment for one year.

The "Bundesrath" has formulated rules for the cleansing and disinfection of cars, as often as they may be used for transporting live stock. These rules are quite specific and need not here be given in detail. The cleansing is in no case to be omitted after discharge of the car, though some discretion may be used in regard to disinfection. This last is to be effected (a) by means of steam of not less than 100°Cent. (212°F.); (b) by a solution of caustic soda or potash (1 part to 500) in water heated to 70°C.; or (c) by a hose throwing a solution of chloride of lime or other approved disinfectant. In case the cars are known or strongly suspected to be infected, still more energetic measures are to be used, under the police regulations of the locality. Similar rules apply to the pens and places used for receiving and loading cattle. Those who supervise the work of cleansing and disinfection for the railroad companies, must conform to the veterinary-police regulations which apply to such matters.

It is apparent from the above that the paternal government compels the observance of sanitary precautions in the interest of the public health; while in this free and happy country property interests are supposed to be an adequate motive for using the same or similar measures. It is safe to say, however, that the usual American plan, apart from sanitary authority, as regards disinfection, is to trust to luck and let chemicals alone. A well-organized medical department would provide and execute all needed regulations of this kind, without legislative interference.

[TO BE CONTINUED.]

Color-Blindness in Railway Employes.

BY DR. B. JOY JEFFRIES.

THE subjoined remarks are selected from an article written by Dr. B. Joy Jeffries, and published in *Gaillard's Medical Journal*. "I think I have convinced the community, including recalcitrant railroad people, of the prevalence of color-blindness. The practical railroad man, however, who would not let a doctor build his bridge, or a civil engineer operate on his eye for cataract, cannot understand the danger from color-blindness. Defective vision when excessive, as from near-sightedness, he may appreciate. He cannot get rid of the idea that his color-blind engineer or fireman does use his color sense to distinguish the night signals. An official in Connecticut told me one of his engineers 'could not tell any color,' and yet he distinguished the colored signals. He would listen to no explanation of mine as to how he did this, and was only silenced by my asking by what sense did the employé distinguish the signals if he had no color perception.

"Railroad officials and commissioners are now forced to admit the existence of color-blindness and its frequency. They are not yet ready, however, to admit its danger, just as they are not ready to admit that employés should have average visual power to be safe in railroad work connected with signal giving and reading. With reference to this last it is useless to argue. The time is not far distant when the community will demand expert proof of every employé's having normal eyesight, and this will be found to be, to every one's surprise, a much higher standard than demanded by any laws now made or proposed in reference to railroad employés or sailors.

"All railroad people are naturally wholly antagonistic to any law compelling them to act as they have not hitherto done. They are, so to speak, eminently practical men, wholly wedded to the theory that a man who, to their test, seems to see colored signals nearly always right, cannot be dangerous, and they, even when admitting danger, will insist on practical tests with flags and lanterns under conditions favorable to the examined. Such tests were long ago found to be useless and unfair to the employé, as well as almost impossible to be carried out so as to exclude the possibility of cheating on his part or that of his friends. The loss of time of the employé, and the great cost of testing, would prevent this method, were it not wholly worthless to determine whether a color-blind sees colors as we do. It has been absolutely proved, and even quite generally admitted, that the color-blind distinguish between the red and green lights by their intensity solely, or by extraneous circumstances having nothing to do with the question of the color of the lights.

"I have never found even the most skeptical otherwise than thoroughly convinced of any degree of color-blindness being dangerous on the railroads and the sea, when they would take the time and the pains to watch examinations made with the various apparatus devised for this purpose, and which so perfectly imitates the conditions of the signals, but leaves out the extraneous conditions that help the color-blind, which extraneous conditions can never be relied on.

"The absurdity of railroad officials and steamboat inspectors testing for color-blindness by flags and lanterns is shown by this —namely, that if they use the bluish-green lights employed both on many roads and sold as often as the green for ship's side-lights, the employé or the pilot can, even if color-blind, see it very much as we do, only somewhat darker. When this light is shown him on the road, he will, of course, say green, because other people call it so. Any different light he will call red, because he knows that is the name of the other one shown, which he does not, of course, see is red, but only different from the other. The green in the glass makes it darker to him, but the blue he sees, since all red or green blind people (one defect practically involving the other) see blue and yellow as we do. Those unfamiliar with the fact would be surprised to see how utterly different are the two lights sold in the shops and used to go on the same (the starboard) side of the vessels. Now this dark bluish-green glass breaks down the amount of light very greatly, and prevents its being seen even by the normal-eyed at a distance it must be to insure safety. Thus the color-blind will escape detection by such officials, and these latter will, as they have, become strengthened in their belief of the infrequency of the defect and its harmlessness.

"If medical experts agreed to do all the work necessary, without compensation, it would not advance the cause of control of defective vision. Let, however, the stockholders be mulcted by heavy damages, and dividends passed, from an accident caused thereby, and the law would be clamored for. Recalcitrant railroad officials would be dropped at the next annual election, against which they naturally would fight as strongly as the color-blind employé. A broken arm or leg will cost any railroad company more than the whole expense of a most thorough examination of all the employés of the road. An accident from defective sight would give these officials now anxious, but unable, to do their duty, the necessary backing up of the general sentiment of the community."

Dr. Jeffries has placed in the Chicago Railway Exposition his "Manual on Color-blindness, its Dangers and its Detection," together with the apparatus described in the book for detecting this curious defect and accurately measuring its amount. The American Master Mechanic Association have also invited him to speak before them during their meeting in Chicago, on defective vision among railroad employés. This invitation he has accepted, and on June 20th, opportunity will be given to all interested, to hear a thoroughly practical exposition of color-blindness and defective sight, and explanation and exhibition of the apparatus used in their detection.

A New Trunk Line.

ANOTHER railroad, that of the New York, West Shore and Buffalo, has been added to the list of great lines centering in New York City, or having it for their headquarters. This road has had peculiar advantage in being constructed at this period in the history of railroad building. One may justly say that almost positive perfection has been reached in constructing road beds; in the manufacture of steel rails, locomotive engines, cars and general equipments. The news, forty years ago, that such a road as the New York, West Shore and Buffalo was completed and with cars running as far as Newburgh, would have excited public interest in Europe and America. Now, it is but one of the great cable strands supporting the structure of our wonderful American railroad system. The remaining portion of the line of the road will be finished early this fall.

The completion of this new double-track, steel-rail Trunk Line, extending along the West Shore of the world-famed Hudson, and through the Valley of the Mohawk, connecting the important cites of New York, Newburgh, Kingston, Albany, Schenectady, Utica, Syracuse, Rochester and Buffalo, besides furnishing another independent highway between the Great Lakes and the principal Atlantic seaports, will be a memorable event of national importance.

Sojourners among the Catskills, or transient visitors to that delightful mountain region, have a personal interest in the provisions already made for their special accommodation and comfort. At Kingston, Union Depot facilities will enable trains to make direct connection with trains of the Ulster and Delaware Railroad, thus obviating the transfer of passengers or baggage. At Catskill, connections will be made with the Catskill Mountain Railroad, in order to accommodate the great number seeking an entrance to the Mountains through that gateway. A speedy trip on an elegantly equipped train, over a superbly built double track, steel rail line, in the cool shadows of the Highlands, around the foot-hills of the Catskills, and traversing all the historic and picturesque points along the west shore of the Hudson, will mark a new era in experience of pleasure travel.

RAILROAD EARNINGS.—MONTHLY.

B., C. Rap. & N.:	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1881	167,750	124,510	148,551	184,680	165,630	205,912	174,351	209,112	221,801	221,748	202,180	232,812	2,259,037
1882	252,823	225,631	224,107	178,304	199,278	211,257	198,276	224,921	261,439	300,155	278,439	246,062	2,800,679
1883	197,402	187,001	252,913	218,253	208,671	.....	.....	.....	.....	.....	.....	.....	.....
Central Pacific:													
1881	1,602,907	1,454,218	1,709,638	1,872,370	2,091,411	2,159,382	1,899,346	2,088,519	2,185,303	2,507,857	2,297,971	2,225,179	24,094,101
1882	1,839,469	1,720,675	1,969,737	2,054,687	2,342,298	2,229,105	2,076,648	2,350,557	2,495,445	2,424,529	2,139,299	2,020,349	25,662,757
1883	1,718,000	1,424,000	2,021,000	2,035,000	2,099,000	.....	.....	.....	.....	.....	.....	.....	.....
Chesapeake and Ohio:													
1881	162,540	184,389	228,479	227,343	252,235	241,135	225,096	262,858	247,144	236,396	230,022	203,562	2,702,762
1882	208,746	179,053	215,445	267,454	257,040	260,753	306,831	371,175	332,219	347,882	287,850	.....	.....
1883	244,142	250,287	270,676	279,659	337,922	.....	.....	.....	.....	.....	.....	.....	.....
Chicago and Alton:													
1881	487,890	461,641	529,915	558,190	548,556	635,860	676,205	769,751	774,790	771,844	672,380	646,812	7,557,741
1882	585,830	517,897	588,700	564,861	559,577	617,250	702,635	856,398	912,692	858,674	749,915	701,066	8,215,495
1883	637,894	538,537	671,576	584,981	630,097	.....	.....	.....	.....	.....	.....	.....	.....
Chicago and Northwestern:													
1881	1,240,664	963,204	1,178,795	1,474,612	1,879,006	2,306,440	1,983,032	2,315,164	2,292,676	2,341,098	2,019,038	1,855,477	21,849,209
1882	1 644,935	1,474,176	1,672,931	1,668,741	2,110,947	2,022,700	2,025,736	2,099,755	2,497,053	2,532,100	2,069,287	1,718,379	23,828,973
1883	1,382,704	1,264,907	2,059,700	1,742,900	2,122,698	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, Burlington and Quincy:													
1881	1,307,948	1,034,821	1,418,149	1,574,371	1,679,455	2,083,803	1,888,358	2,173,945	2,262,981	2,031,001	1,816,133	1,905,490	21,176,455
1882	1 658,834	1,457,300	1,566,217	1,530,838	1,505,261	1,437,164	1,625,006	2,086,858	2,186,400	2,270,444	2,199,421	2,027,060	22,550,804
1883	1,625,680	1,611,021	2,396,583	1,824,130	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, Milwaukee and St. Paul:													
1881	990,847	682,717	916,989	1,259,946	1,538,491	1,729,811	1,568,706	1,678,361	1,644,670	1,591,052	1,569.597	1,854 269	17,025,462
1882	1,434,536	1,376,376	1,561,386	1,517,567	1,627,931	1,620,000	1,465,000	1,545,000	1,950,000	2,251,000	2,072,000	1,964,000	20,386,726
1883	1,359,000	1,258,000	2,044,000	1,972,000	2,034,000	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, St. Paul, Minneapolis and Omaha:													
1881	257,786	158,594	251,648	261,211	350,124	404,562	383,202	385,586	373,370	379,029	592,921	432,615	3,981,296
1882	327,498	333,200	413,200	377,288	402,882	363,109	331,480	394,555	482,997	546,671	317,595	375,796	4,973,052
1883	302,700	277,900	415,800	419,535	446,746	.....	.....	.....	.....	.....	.....	.....	.....
Denver and Rio Grande:													
1881	307,476	317,681	398,493	433,111	514,767	584,230	548,284	606,193	589,287	638,432	547,055	626,728	5,980,488
1882	488,599	407,000	521,500	556,917	606,400	537,462	495,797	574,040	595,306	630,598	512,965	443,000	6,349,857
1883	418,300	433,400	521,600	573,700	631,900	.....	.....	.....	.....	.....	.....	.....	.....
Hannibal and St. Joseph:													
1881	154,401	122,874	176,356	190,812	172,950	190,740	201,899	210,240	215,103	231,913	195,607	194,336	2,230,961
1882	125.601	152,691	185,368	158,113	165,630	147,526	184,609	254,569	239,732	238,563	249 252	239,891	2,303,388
1883	179,591	180,887	228,410	193,481	194,394	.....	.....	.....	.....	.....	.....	.....	.....
Illinois Central:													
1881	631,281	524,490	557,789	662,493	673,259	803,887	720,004	868,407	828,847	815,238	737 218	763,475	8,586,397
1882	1,019,453	987,998	995,474	887,543	891,328	663,746	752,251	813,600	828,238	865,325	752,144	697,051	8,831,281
1883	1,058,620	931,971	1,106,658	888,431	947,216	.....	.....	.....	.....	.....	.....	.....	.....
Indiana, Bloomington and Western:													
1881	90,283	83,261	192,085	203,677	200,064	199,846	190,125	272,114	247,332	225,678	200,450	192,622	2,487,569
1882	195,824	175,755	204,538	205,934	182,554	186,133	206,072	278,814	273,100	269,046	256,998	205,212	2,641,675
1883	248,142	202,931	268,801	215,912	234,151	.....	.....	.....	.....	.....	.....	.....	.....
Louisville and Nashville:													
1881	812,118	805,124	947,959	855,704	828,726	1,227,885	817,135	876,192	951,566	1,002,950	1,065,223	1,153,779	11,344,361
1882	964,527	960,315	1,068,834	953,603	958,130	1,215,490	1,063,765	1,043,912	1,114,513	1,215,932	1,192,390	1,221,509	12,981,432
1883	1,118,735	1,015,000	1,141,337	941,129	1,050,615	.....	.....	.....	.....	.....	.....	.....	.....
Mobile and Ohio:													
1881	224,347	216,768	230,916	163,551	145,803	136,517	135,546	160,789	210,262	256,924	262,986	258,812	2,403,224
1882	159,676	158,590	148,166	141,957	134,378	136,184	135,174	137,475	157,874	267,433	295,110	307,643	2,179,666
1883	216,608	172,200	180,113	128,462	143,294	.....	.....	.....	.....	.....	.....	.....	.....
Nashville, Chattanooga and St. Louis:													
1881	178,143	190,866	207,710	183,525	104,430	154,549	150,430	168,317	179,979	172,121	152,059	173,127	2,075,258
1882	170,753	174,974	177,336	167,393	135,556	119,074	160,991	168,304	168,999	180,319	181,336	186,352	1,933,047
1883	197,388	195,262	206,164	161,435	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York and New England:													
1881	189,749	173,614	212,019	216,913	217,185	231,518	246,821	280,524	299,573	261,200	240,764	240,063	2,809,255
1882	213,840	217,261	265,222	261,044	289,722	295,392	298,441	346,490	338,347	310,145	276,183	261,082	3,408,169
1883	258,266	231,741	284,869	268,853	290,951	.....	.....	.....	.....	.....	.....	.....	.....
New York, Lake Erie and Western:													
1880	1,296,381	1,252,218	1,644,958	1,643,151	1,592,544	1,661,812	1,580,976	1,606,874	1,786,417	1,899,910	1,799,338	1,726,788	19,149,361
1881	1,443,437	1,425,765	1,847,261	1,709,057	1,776,891	1,794,982	1,787,081	1,772,895	1,734,200	1,814,866	1,715,469	1,571,208	20,393,112
1882	1,318,997	1,304,757	1,567,632	.....	.....	.....	.....	.....	.....	1,819,010	1,818,824	1,691,404	20,203,469
1883	1,524,869	1,283,616	1,696,969	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Northern Central:													
1881	386,157	382,657	452,906	487,273	465,588	487,287	440,811	498,008	429,565	449,664	487,160	476,622	5,443,697
1882	407,368	413,551	414,789	420,490	482,607	482,762	509,683	667,488	592,435	550,225	526,685	490,003	5,800,176
1883	499,252	486,865	506,864	476,335	.....	.....	.....	.....	.....	.....	.....	.....	.....
Northern Pacific:													
1881	116,508	78,803	162,984	216,210	312,705	412,024	393,260	434,085	534,363	583,655	475,610	439,724	4,044,576
1882	245,369	268,935	373,141	451,023	616,231	704,617	694,067	727,215	772,838	829,831	761,324	564,749	7,009,344
1883	392,035	373,091	583,400	675,200	775,600	.....	.....	.....	.....	.....	.....	.....	.....
Philadelphia and Erie:													
1881	224,303	225,501	285,573	293,323	343,792	350,585	291,669	303,849	276,522	292,392	284,078	282,772	3,454,309
1882	252,727	245,246	265,311	277,851	341,415	347,614	377,206	20,3294	386,455	397,164	369,583	335,513	4,011,413
1883	319,720	295,638	308,069	311,636	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis and San Francisco:													
1881	212,435	178,234	262,050	265,298	283,399	260,254	252,333	286,373	279,064	308,569	284,320	287,914	3,160,245
1882	256,784	244,654	274,959	242,806	253,419	240,177	318,613	381,637	336,805	360,900	331,490	339,424	3,582,811
1883	278,321	236,278	351,689	274,011	296,756	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Alton and Terre Haute:													
1881	175,725	166,012	201,137	197,447	172,177	165,896	165,393	189,180	196,368	204,338	169,795	171,127	2,112,801
1882	168,987	149,619	177,609	165,401	162,842	142,742	192,017	236,137	217,659	229,962	206,040	184,526	2,245,320
1883	193,614	177,717	204,762	160,805	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Iron Mountain and Southern:													
1881	570,957	560,791	704,002	548,300	479,075	474,302	533,512	644,386	708,325	719,239	687,271	709 498	7,319,744
1882	516,370	501,127	585,008	581,977	519,120	529,700	515,519	675,981	724,160	809,394	843,973	781,305	7,581,635
1883	665,258	522,781	632,228	.....	558,788	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul, Minneapolis and Manitoba:													
1881	254,187	159,482	320,962	425,685	382,642	405,322	387,488	414,954	485,736	605,708	508,530	528,262	4,878,960
1882	395,461	418 358	531,071	570,890	858,902	856,417	853,296	801,759	832,776	979,057	913,335	753,515	8,764,770
1883	489,763	389,612	729,844	812,008	727,499	.....	.....	.....	.....	.....	.....	.....	.....
Texas and Pacific:													
1881	281,176	260,781	319,928	295,066	281,782	285,405	328,063	381,331	345,790	419,203	369,521	401,058	3,921,569
1882	323,987	278,535	343,442	359,543	421,219	384,713	367,215	439,918	470,613	541,901	619,655	641,044	5,143,179
1883	534,529	416,040	526,901	.....	496,278	.....	.....	.....	.....	.....	.....	.....	.....
Union Pacific Railway:													
1881	1,339,799	1,374,740	1,674,860	1,766,894	2,319,238	2,884,774	2,528,826	2,638,659	2,844,357	3,169,530	2,723,608	2,267,004	29,776,899
1882	2,186,020	1,835,620	2,392,593	2,369,609	2,491,590	2,508,453	2,301,000	2,762,107	2,949,112	3,158,337	2,821,070	2,294,000	30,088,109
1883	1,986,535	1,743,207	2,489,405	2,435,844	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wabash, St. Louis and Pacific:													
1881	865,339	813,374	1,109,399	967,033	1,148,669	1,330,944	1,120,615	1,542,124	1,497,246	1,406,029	1,372,360	1,294,657	14,467,790
1882	1,220,965	1,134,768	1,313,776	1,378,191	1,204,864	1,149,632	1,418,837	1,772,544	1,682,382	1,595,680	1,525,715	1,331,952	16,738,360
1883	1,307,783	1,070,758	1,479,236	.....	1,213,946	.....	.....	.....	.....	.....	.....	.....	.....

RAILROAD, TRAMWAY AND CANAL DIVIDEND STATEMENT.

Showing the amount of Stock Outstanding, the Dividend Periods and the date of last Dividend.

Marked thus (*) are leased roads.	Stock out-standing.	Divide'd Periods.	Last Dividend Payable.
Albany and Susquehanna*.....100	3.500.000	semi-an	July 1, '83 2
Atchison, Topeka and Santa Fe.....100	56,932,200	q'arterly	May 15, '83 1½
Atlanta and Charlotte Air Line 100	1,700,000	semi-an	Mar. 5, '83 2
Atlanta and West Point.....100	1,232,200	semi-an	Feb. 1, '83 6½
Atlantic and St. Lawrence*.....100	5,484,000	semi-an	Mar. 15, '83 3½
Augusta and Savannah.....100	1,032,200	semi-an	Dec. 4, '82 3¾
Baltimore & Hanover.....100	88,805	.....	Apl. 9, '83 3
Baltimore and Ohio.....100	14,792,566	semi-an	May 1, '83 5
" " pref.....100	5,000,000	semi-an	July 1, '83 3
Washington Branch.....100	1,650,000	q'arterly	May 1, '83 5
Berkshire* 100	600,000	annual..	Apl. 2, '83 1¾
Boston and Albany.....100	20,000,000	q'arterly	May 30, '83 2
Boston & New York Air Line pref....100	2,795,227	semi-an	Apl. 15, '83 2
Boston, Concord & Montreal pref*....100	800,000	semi-an	May 15, '83 3
Boston and Lowell.....500	3,792,000	semi-an	Jan. 1, '83 4½
Boston and Maine.....100	7,000,000	semi-an	May 15, '83 4
Boston & Providence.....100	4,000,000	semi-an	May 1, '83 4
Attleborough Branch.....100	131,700	semi-an	Jan. 1, '83 3½
Boston, Revere Beach & Lynn.....100	419,400	semi-an	Jan. 1, '83 3
Buffalo, New York & Erie*.....500	950,000	semi-an	June 1, '83 3
Buffalo, New York & Philadelphia pf. 50	6,000,000	q'arterly	June25, '83 1½
Camden & Atlantic..... 50	377,400	q'arterly	Nov. 1, '82 4
" " pref.....100	880,650	q'arterly	Nov. 1, '82 3
Camden & Burlington County.....100	381,925	semi-an	Jan. 1, '83 3
Canada Southern.....100	15,000,000	.....	Feb. 1, '81 2½
Cape May & Millville*..... 50	447,000	semi-an	June 1, '83 3
Catawissa 50	1,159,500	annual	Oct. 1, '82 2½
" pref 00	2,200,000	semi-an	May 16, '83 3½
" new pref..... 50	1,000,000	semi-an	May 16, '83 3½
Cayuga and Susquehanna*..... 50	589,110	semi-an	July 1, '83 4½
Cedar Rapids & Missouri River* 100	6,850,400	q'arterly	May 1, '83 1½
" " " pref..100	769,600	semi-an	Feb. 1, '83 3½
Central of Georgia.....100	7,500,000	semi-an	June26, '83 4
Central Ohio* 50	2,437,950	semi-an	Jan. 31, '83 3
" pref.. 50	411,550	semi-an	Jan. 31, '83 3
Central of New Jersey*.....100	18,563,200	q'arterly	Dec. 1, '83 1½
Central Pacific 150	59,275,500	semi-an	Feb. 1, '83 3
Cheshire preferred.....100	2,153,300	semi-an	Jan. 10, '83 1½
Chicago and Alton.....100	12,504,600	semi-an	Mar. 1, '83 4
" " pref 100	2,425,400	semi-an	Mar. 1, '83 4
Chicago, Burlington & Quincy.....100	69,814,191	q'arterly	June 15, '83 2
Chicago, Iowa & Nebraska*..... 100	3,916,200	semi-an	July 1, '83 4
Chicago, Milwaukee & St. Paul.....100	27,964,261	semi-an	Apl. 16, '83 3½
" " " pref...100	16,540,983	semi-an	Apl. 16, '83 3½
Chicago & Northwestern..... 100	16,737,655	semi-an	June28, '83 3½
" " pref.....100	22,210,844	q'arterly	June28, '83 2
Chicago, Rock Island & Pacific.....100	41,960,000	q'arterly	May 1, '83 1¾
Chicago & West Michigan.....100	6,796,800	semi-an	Feb. 15, '83 3
Chicago, St. Paul, Minn. & Omaha pf...100	11,396,600	q'arterly	July 20, '83 1¾
Cincinnati, Hamilton & Dayton.....100	3,500,000	semi-an	Jan. 5, '83 3
Cincinnati, Ind., St. Louis & Chicago.100	8,000,000	q'arterly	Apl. 16, '83 1½
Cincinnati, Sandusky & Cleveland pf. 50	428,850	semi-an	May 1, '83 3
Cleveland Columbus, Cincin. & Ind..100	14,991,800	.....	Feb. 1, '83 2
Cleveland & Pittsburg*..... 50	11,235,43c	q'arterly	June 1, '83 1¾
Columbus & Xenia*..... 50	1,786,200	q'arterly	June 10, '83 2
Columbus, Hocking Valley & Toledo 100	10,316,500	.....	Jan. 10, '83 2½
Concord 50	1,500,000	semi-an	May 1, '83 5
Concord and Portsmouth*.....100	350,000	semi-an	July 1, '83 3½
Connecticut & Passumpsic Rivers....100	2,244,400	semi-an	Feb. 1, '83 3
Connecticut River.....100	2,370,000	semi-an	Jan. 1, '83 4
Cumberland Valley..... 50	1,292,950	q'arterly	July 2, '83 2½
" 1st pref..... 50	241,900	semi-an	Apl. 2, '83 4
" 2d pref. 50	243,000	semi-an	Apl. 2, '83 4
Danbury & Norwalk..... 50	600,000	semi-an	Apl. 1, '83 2½
Dayton and Michigan*..... 50	2,402,573	semi-an	Apl. 1, '83 1¾
" " pref. 50	1,211,250	q'arterly	July 1, '83 2
Delaware*..... 25	1,468,940	semi-an	July 2, '83 3
Delaware & Bound Brook*..... 100	1,652,000	q'arterly	May 14, '83 1¾
Delaware, Lackawanna & Western 50	26,200,000	q'arterly	Apl. 20, '83 2
Denver & Rio Grande..... 100	33,000,000	q'arterly	Jan. 14, '82 1½
Detroit, Lansing & Northern.....100	1,825,600	semi-an	Feb. 15, '83 3
" " " pref.....100	2,503,380	semi-an	Feb. 15, '83 3
Dubuque & Sioux City*..... 100	5,000,000	semi-an	Apl. 16, '83 3
East Pennsylvania*..... 50	1,709 550	semi-an	Jan. 18, '83 3
East Mahanoy*..... 50	392,950	semi-an	July 1, '83 3
Eastern (N. H.).....100	492,500	semi-an	June15, '83 2¼
Eel River..... 100	3,000,000	q'arterly	June 5, '83 1
Elmira & Williamsport*..... 50	500,000	semi-an	May 1, '83 2½
" " pref..... 50	500,000	semi-an	July 1, '83 3½
Erie and Pittsburgh*..... 50	1,998,400	q'arterly	June 10, '83 1½
European & North American.....100	2,500,000	semi-an	Apl. 1, '83 2½
Evansville & Terre Haute.... 50	3,100,000	.....	Jan. 1, '83 6b
Fitchburg.....100	4,950,000	semi-an	July 1, '83 3
Flint & Pere Marquette pref.....100	6,500,000	semi-an	July 16, '83 3½
Fort Wayne & Jackson pref.....100	2,284,800	.....	May 4, '82 2
Georgia, ...100	4,200,000	q'arterly	Apl. 15, '83 2½
Granite.....100	1,250.000	semi-an	Jan. 1, '83 3
Greenwich & Johnsonville..... 100	118,000	semi-an	Jan. 1, '83 4
Hannibal & St. Joseph pref.....100	5,083,024	semi-an	Feb. 15, '83 3
Harrisburg & Lancaster..... 50	1,182,500	semi-an	July 10, '83 3½
Hartford & Connecticut Western 100	2,700,000	.....	Dec. 1, '82 1½
Housatonic pref. 100	1,180,000	q'arterly	Apl. 15, '83 2
Illinois Central.....100	39,000,000	semi-an	Mar. 1, '83 4
Iowa Falls & Sioux City*.....100	4,623,500	q'arterly	June 1, '83 1½
Iowa R.R.& Land Co..... 100	7,620,000	q'arterly	May 1, '83 1
Jeffersonville, Madison & Indi'apolis..100	2,000,000	q'arterly	May 1, '81 1¾
Joliet and Chicago*.....100	1,500,000	q'arterly	July 1, '83, 1¾
Kansas City, Fort Scott & Gulf.....100	4,648,000	.....	Feb. 15, '83 3
" " " pref.100	2,750,000	semi-an	Feb. 15, '83, 4
Lake Shore & Michigan Southern 100	49,466,500	q'artery	May 1, '83, 2
" " (guar.)..100	533,500	semi-an.	Feb. 1, '83, 5
Lawrence*..... 50	450,000	q'arterly	July 1, '83, 2

Marked thus (*) are leased roads.	Stock out-standing.	Divide'd Periods.	Last Dividend Payable.
Lehigh Valley..... 50	27,496,895	q'arterly	Apl. 16, '83 2
" pref..... 50	106,300	q'arterly	Apl. 16, '83 2½
Little Miami..... 50	4,637,300	q'arterly	June10, '83 2
Little Schuylkill*.. 50	2,646,100	semi-an.	Jan. 12, '83 3½
Long Island. 50	10,000,000	q'arterly	May 1, '83 1
Louisville & Nashville.....100	25,000,000	semi-an.	Feb. 1, '82 3
Lowell & Andover.....100	500,000	semi-an.	Jan. 1, '83 3½
Lykens Valley 20	600,000	q'arterly.	Jan. 3, '83 2½
Maine Central. 100	3,603,300	semi-an.	Feb. 15, '83 2½
Manchester & Lawrence.....100	1,000,000	semi-an.	May 1, '83 5
Manhattan 100	13,000,000	.....	.....
" 1st pref.....100	6,500,000	q'rterly.	Apl. 2, '83 1½
" 2d pref.....100	6,500,000	q'rterly.	Jan. 2, '83 1½
Marquette, Houghton & Ontonagon...100	2,756,600	....	Feb.15, '83 4
" " pref.100	2,259 026	semi-an.	Feb. 15, '83 4
Massawippi*..... 100	400,000	semi-an.	Feb. 1, '83 3
Metropolitan 100	6,500,000	q'rterly	Oct. 2, '82 1½
Michigan Central.....100	18,738,204	semi-an.	Feb. 1, '83 2
Middlesex Central.....100	280,000	semi-an.	Feb. 1, '83 3
Mill Creek & Minehill* 50	323,000	semi-an.	July 1, '83 5
Mine Hill & Schuykill Haven*..... 50	4,022,500	semi-an.	Jan. 12, '83 3½
Missouri Pacific.....100	30,000,000	q'rterly.	July 2, '83 1¾
Morris and Essex.... 50	15,000,000	semi-an.	July 2, '33 3½
Mount Carbon & Port Carbon..... 50	282,350	semi-an.	July 2, '83 6
Nashua and Lowell..... 100	800,000	semi-an.	May 1, '83 4
Nashua & Rochester.....100	1,305,800	semi-an.	Apl. 2, '83 1½
Nashville & Decatur.....100	1,356,632	semi-an.	June10, '83 3
Nashville, Chattanooga & St. Louis... 25	6,670,325	semi-an.	Apl. 20, '82 1½
Naugatuck 100	2,000,000	semi-an.	Jan. 15, '83 5
Nesquehoning Valley*..... 50	1,300,000	semi-an.	Mar. 1, '83 3
New Castle & Beaver Valley*... 50	700,000	q'rterly.	July 1, '83 —
New London Northern*..... 100	1,500,000	q'rterly.	July 1, '83 1½
New York Central & Hudson River....100	89,428,330	q'rterly.	July 16, '83 2
New York and Harlem.....100	8,500,000	semi-an.	July 2, '83 4
" " pref.....100	1,500,000	semi-an.	July 2, '83 4
" City Line..... —	.....	annual	Apl. 2, '83 2
New York, Lackawanna & Western...100	10,000,000	q'rterly	Apl. 2, '83 1¾
New York, Lake Erie & Western.....100	77,087,600	.....	.....
" " " pref....100	7,987,500	annual..	Jan. 2, '83 6
New York, New Haven & Hartford....100	15,500,000	semi-an.	Jan. 2, '83 5
New York, Ontario & Western pref....100	2,000,000	.....	Mar. 1, '83 12
New York, Providence & Boston.....100	3,000,000	q'rterly.	May 10, '83 2
Niagara Bridge & Canandaigua* 100	1,000,000	semi-an.	July 1, '83 3
North Carolina*..... 100	3,000,000	semi-an.	Mar. 1, '83 3
" " pref..... 100	1,000,000	semi-an.	Mar. 1, '83 3
Norfolk & Western pref..... —	15,000,000	q'rterly.	Dec. 15, '82 $1
Northeastern (South Carolina)..... 50	899,350	.....	Apl. 2, '83 3
North Pennsylvania..... 50	4,399,750	q'rterly.	May 25, '83 1¾
Northern Central..... 50	6,500,000	semi-an.	Jan. 15, '83 4
Northern New Hampshire.....100	3,068,400	semi-an.	June 1, '83 3
Northern Pacific pref..... 100	41,909,132	....	Jan. 15, '83 11.1
Norwich & Worcester*..... 100	2,604,400	semi-an.	Jan. 10, '83 5
Oregon & Transcontinental.....100	40,000,000	q'rterly.	Apl. 10, '83 1½
Old Colony 100	7,533,800	semi-an.	Jan 1, '83 3½
Oregon Improvement Co.....100	5,000,000	semi-an.	Mar. 1, '83 3½
Oregon Railway & Navigation Co.....100	18,000,000	q'rterly.	May 1, '83 2½
Oswego & Syracuse.....100	1,320,400	semi-an.	Feb. 1, '83 4½
Panama 100	7,000,000	semi-an.	Jan. 10, '83 6½
Paterson & Hudson*..... 100	630,000	semi-an.	Jan. 3, '83 4½
Paterson & Ramapo..... 100	248,000	semi-an.	July 1, '82 4
Pemberton & Hightstown*..... .. 50	342,150	semi-an.	July 1, '83 3
Pennsylvania.....A..... ... 50	85,751,550	semi-an.	May 29, '83 4
Pennsylvania Co.. 50	20,000,000	semi-an.	June15, '83 2
Peoria & Bureau Valley*..... 100	1,500,000	semi-an.	Feb. 1, '83 4
Philadelphia, Ger. & Norrist'n*..... 50	2,231,900	q'rterly.	June 3, '83 3
Philadelphia and Trenton.....100	1,259,100	q'rterly.	July 10, '83 2½
Philadelphia, Wilmington and Balt... 50	11,795,050	semi-an.	Jan. 2, '83 4
Pittsburgh, Fort Wayne & Chicago*...100	19,714,285	q'rterly.	July 2, '83 1¾
" Special Imp... 100	7,698,900	q'rterly.	July 3, '83 1¾
Pittsfield & North Adams.....100	450,000	semi-an.	Jan. 1, '83 2½
Portland, Saco & Portsmouth..... 100	1,500,000	semi-an.	Jan. 15, '83 3
Providence & Worcester.....100	2,500,000	semi-an.	Jan. 1, '83 3
Rensselaer & Saratoga*.....100	6,854,100	semi-an.	July 2, '83 4
Richmond & Danville.....100	5,000,000	q'rterly.	Aug. 15, '82 2
Richmond & Petersburg.....100	1,009,300	semi-an.	Aug. 1, '82 2
Rochester & Genesee Valley* 100	555,200	semi-an.	Jan. 1, '83 3
Rome, Watertown & Ogdensburg.. 100	5,293,900	.....	Jan. 1, '83 3
Rutland preferred.....100	4,000,000	semi-an.	Sept. 1, '82 1
Spuyten Duyvil & Port Morris 100	989,000	semi-an.	Jan. 2, '83 4
St. Louis, Alton & Terre Haute pref. ..100	2,468,406	.....	May 1, '83 7
St. Louis & San Francisco 1st pref....100	4,500,000	semi-an.	Feb. 1, '83 3½
St. Louis, Jacksonville & Chicago....100	1,293,000	.....	Aug. 1, '82 4½
" " " pref..100	1,034,000	.....	Aug. 1, '82 4½
St. Paul & Duluth pref.....100	5,121,700	semi-an.	Jan. 1, '83 3½
St. Paul, Minneapolis & Manitoba... 100	20,000,000	q'rterly.	May 1, '83 2
Schuylkill Valley*..... 50	576,050	semi-an.	Jan. 15, '83 2½
Seaboard & Roanoke..... 100	1,302,200	semi-an.	May 1, '83 5
Shamokin Valley & Pottsville... 50	869,450	semi-an.	Feb. 1, '83 3
Shore Line*..... 100	1,000,000	semi-an.	Jan. 6, '83 4
Sioux City & Pacific pref.....100	169,000	semi-an.	Apl. 2, '83 3¾
South Branch (N. J.)*..... 100	438,300	semi-an.	Jan. 2, '83 3
South Western (Ga.)*..... 100	5,031,700	semi-an.	July 26, '82 3½
Stockbridge & Pittsfield*..... 100	448,700	q'rterly.	Apl. 2, '83 1½
Sunbury & Lewistown..... 50	161,000	semi-an.	Apl. 2, '83 3
Syracuse, Binghamton & New York*..100	2,500,000	semi-an.	Feb. 1, '83 2
Terre Haute & Indianapolis..... 100	1,988,150	semi-an.	Feb. 1, '83 4
Union Pacific 100	60,854,105	q rterly.	July 2, '83 1¾
United Companies of New Jersey*....100	21,090,400	q'rterly.	July 10, '83 2½
Utica, Shenango & Susq. Valley..... .100	4,000,000	semi-an.	Nov. 1, '82 3
Utica and Black River..... 100	1,772,000	semi-an.	Mar 31, '83 2
Vermont and Massachusetts..... 100	3,050,000	semi-an.	Apl. 7, '83 3
Vermont Valley..... .100	1,000,000	annual	Jan. 2, '83 3

RAILROAD, TRAMWAY AND CANAL DIVIDEND STATEMENT.

(CONTINUED.)

Showing the amount of Stock Outstanding, the Dividend Periods and the date of last Dividend.

Marked thus (*) are leased roads.	Stock out-standing.	Divide'd Periods.	Last Dividend Payable.
Ware River*.....100	750,000	semi-an.	July 3, '83 3½
Warren (N. J.).....100	1,800,000	semi-an.	Apl. 1, '83 3½
West Jersey.....50	1,375,800	semi-an.	Mar. 15, '83 38
Wilmington & Weldon.....100	2,082,400	semi-an.	Jan. 15, '83 3
Wilmington, Columbia & Augusta....100	960,000	semi-an.	Jan. 10, '83 3
Winchester & Potomac*.....100	180,000	semi-an.	Jan. 1, '83 3
Winchester & Strasburg*.....100	74,700	semi-an.	Jan. 1, '83 3
Worcester & Nashua.....75	1,789,800	semi-an.	Jan. 1, '83 1½
TRAMWAYS.			
Baltimore City 25	1,000,000	annual	Jan. 1, '83 3
Baltimore, Catonsville & El. Mills....100	80,000	semi-an.	Jan. 1, '83 2½
Bleecker Street & Fulton Ferry.....100	900,000	semi-an.	July 1, '82 ⅝
Boston & Chelsea pref.....50	110,000	semi-an.	Apl. 2, '83 3
Broadway (Brooklyn).....100	250,000	semi-an.	Apl. 1, '83 3
Broadway & 7th Avenue (New York)..100	2,100,000	q'arterly	Apl. 1, '83 2
Brooklyn City & Newtown.....100	880,600	q'arterly	Apl. 1, '83 3
Brooklyn City 100	2,000,000	semi-an.	May. 1, '83 3½
Bushwick (Brooklyn).....100	400,000	q'arterly	Apl. 1, '83 3
Cambridge (Mass.).....100	908,000	semi-an.	Apl. 2, '83 4½
Central Park, North & East River.....100	1,800,000	q'arterly	Apl. 1, '83 2
Christopher & Tenth Street.....100	650,000	q'rterly.	Feb. 1, '83 2½
Citizens' (Phil.).....50	192,500	semi-an.	Apl. 1, '83 2½
Citizens' (Pbg.).....50	200,000	q'rterly.	.. ....'80 14½
Coney Island & Brooklyn.....100	500,000	semi-an.	July 1, '83 3
Continental (Phil.).....50	580,000	semi-an.	Jan. 1, '83 –
Dry Dock, East Broadway & Battery..100	1,200,000	semi-an.	May 1, '83 3
Eighth Avenue (New York).....100	1,000,000	q'arterly	Apl. 1, '83 3
Forty-second St. & Grand St. Ferry.. 100	748,000	q'rterly.	May 1, '83 6
Frankford & Southwark (Phila.).....50	600,000	semi-an.	Apl. 1, '83 4
Germantown, (Phila.).....50	1,540,902	q'rterly.	Apl. 1, '83 2½
Girard College (Phila.).....50	500,000	q'rterly.	July 1, '71 3
Grand Street & Newtown.....100	170,000	semi-an.	Jan. 1, '83 2½
Green & Coates Street (Phila.).....50	708,650	semi-an.	Apl. 1, '83 3
Hestonville, Mantua & Fairmount ...50	299,381	q'rterly.	Jan. 1, '75 4
Highland (Boston).....100	600,000	semi-an.	Jan. 1, '83 4
Lombard & South Streets (Phila.).....25	195,000	semi-an.	Oct. 1, '75 4
Lynn and Boston.....100	200,000	semi-an.	May 1, '83 4
Metropolitan (Boston).....50	1,500,000	semi-an.	Jan. 1, '83 4
Middlesex (Boston).....100	650,000	semi-an.	May 15, '83 3½
Ninth Avenue (New York).....100	797,320	semi-an.	....
People's (Phila.) pref.....25	115,250	.....	July 1, '82 2
Philadelphia City.....50	475,000	semi-an.	July 1, '82 4
Philadelphia and Darby.....20	200,000	semi-an.	July 1, '81 3½
Philadelphia & Grey's Ferry.....50	308,000	semi-an.	Jan. 1, '82 6
Pittsburgh, Allegheny & Manchester. 50	300,000	q'rterly.	Oct. 1, '81 3
Ridge Avenue (Phila.).....50	420,000	semi-an.	Apl. 1, '83 5½
Second Avenue (New York).....100	1,199,500	semi-an.	Jan. 1, '83 2½
Second & Third Streets (Phila).....50	771,076	q'rterly.	Apl. 1, '83 4
Seventeenth & Nineteenth sts (Phila.). 50	250,000	semi-an.	July 1, '81 3
Sixth Avenue (New York).....100	750,000	semi-an.	May 1, '83 4½
Somerville (Boston).....100	113,000	semi-an.	May 1, '83 3
South Boston.....50	600,000	semi-an.	Jan. 1, '83 4
Third Avenue, (New York) 100	2,000,000	q'rterly.	May 1, '83 5
Thirteenth & Fifteenth Sts. (Phila.)... 50	334,529	q'rterly.	Apl. 1, '83 4
Twenty-third Street (New York).....100	600,000	semi-an.	Feb. 1, '83 4
Union, (Boston) 100	374,300	semi-an.	Jan. 2, '82 4
Union, (Phila.) 50	751,100	semi-an.	Jan. 1, '83 –
West Philadelphia.....50	750,000	semi-an.	July 1, '77 10
CANALS.			
Chesapeake and Delaware 50	2,078,038	semi-an.	June 1, '75 2
Delaware Division.....50	674,950	semi-an.	Feb. 15, '83 2
Delaware and Hudson.....100	20,000,000	q'rterly.	June 11, '83 1¾
Delaware & Raritan*.....100	5,847,400	q'rterly.	July 10, '83 2½
Lehigh Coal and Navigation.....50	11,273,400	semi-an.	June 6, '83 2½
Monongahela Navigation.....50	1,004,500	semi-an.	Jan. 1, '83 $3
Morris, consolidated.....100	1,025,000	semi-an.	Feb. 1, '63 2
" preferred.....100	1,175,000	semi-an.	Feb. 1, '83 5
Pennsylvania.....50	4,501,200	.....	.....
Schuylkill Navigation com.*.....50	859,100	semi-an.	June 8, '83 35c.
" " pref.....50	3,200,000	semi-an.	June 8, '83 70c.
MISCELLANEOUS.			
Adams Express 100	12,000,000	q'rterly.	June 1, '83 2
American Express.....50	18,000,000	semi-an.	July 2, '83 3
Calumet & Hecla Mining Co.....50	100,000 S.	q'rterly.	May 15, '83 $5
Central Mining Co.....100	.....	annual.	Feb. 15, '83 $3
Consolidation Coal.....100	10,250,000	semi-an.	Jan. 27, '82 2
George's Creek Coal & Iron 100	.....	semi-an.	Jan. 1, '83 3
Maryland Coal 100	4,400,000	semi-an.	Feb. 1, '76 1½
Missouri Valley Land Co.....100	200,000	semi-an.	Jan. 1, '83 $6
National Tube Works.....100	2,000,000	q'rterly.	Apl. 2, '83 2
Pacific Mail Steamship.....100	20,000,000	q'rterly.	May 1, '83 3
Pennsylvania Coal.....50	5,000,000	q'rterly.	May 15, '83 2
Pullman Palace Car.....100	10,000,000	q'rterly.	May 15, '83 2
Quicksilver, com.....100	5,708,700	.....	May 1, '82 2 0.4
" pref.....100	4,291,300	.....	May 1, '82 6
Quincy Mining Co.....25	40,000 shs	semi-an.	Feb. 15, '83 $6
Quincy Railroad Bridge.....100	1,750,000	semi-an.	Jan. 1, '83 5
Sioux City & Iowa Falls L. & L. Co....100	500,000	semi-an.	Jan. 1, '83 3½
Spring Mountain Coal.....100	1,500,000	semi-an.	June 11, '83 3½
Topeka Equipment Co.....100	255,500	semi-an.	Apl. 2, '83 5
United States Express.....100	7,000,000	q'rterly	May 1, '83 1
Wells, Fargo & Co. Express.....100	6,250,000	semi-an.	Jan. 1, '83 4
Western Union Telegraph.....100	80,000,000	q'rterly.	Apl. 1, '83 1¼

FINANCIAL AND COMMERCIAL DEPARTMENT.

NEW YORK, MONDAY, JUNE 11, 1883.

THE rates for money on call on stocks as collateral during the forenoon were 2½@3 per cent.; after 12.30 o'clock the rates were 2½ per cent., and after 2 o'clock, 3 per cent.

The posted rates for foreign exchange were 4.86@4.89½. The actual rates were as follows: Sixty days, 4.85¼@4.85¾; demand, 4.88½@4.88¾; cables, 4.89½@4.89¾. Commercial bills were 4.83½@4.84½.

Continental bills were as follows: Francs, 5.18¾@5.19⅜ and 5.16¼@5.16⅞; Reichsmarks, 94⅝@94¾ and 95⅛@95¼; Guilders, 40@40⅛ and 40¼@40⅜.

Three mortgages from the Cincinnati, Washington and Baltimore (formerly the Marietta and Cincinnati) Railway Company have been filed of record: the first for $3,040,000 to secure the second mortgage bonds, the second for $2,270,000 to secure the third mortgage bonds, and the third to secure $3,500,000 of first income and $4,000,000 of second income bonds. This is simply carrying out the plan of reorganization of the company.

From the report of the Baltimore and Potomac Railroad Company for the year ending December 31, 1882, which was presented at the annual meeting of the stockholders held in Baltimore on the 6th inst., we learn that the gross earnings were: from the Washington line and Tunnel, $1,046,077.76 and from the Pope's Creek line, $50,930.61—total, $1,097,008.37; the total expenses were: Washington line and Tunnel, $728,591.35 and the Pope's Creek line $62,130.30—total, $790,721.65, showing a gain in operating the Washington line and Tunnel of $317,486,41 and a loss on the Pope's Creek line of $11,199.69—the total net earnings being $306,286.72. Compared with the previous year the gross earnings show an increase of $120,576.52, and the expenses a decrease of $50,201.61, making the increase in net earnings $180,778.13, or 144 per cent.

The treasurer of the Chicago, St. Paul, Minneapolis and Omaha Railroad Company has notified the Stock Exchange that it will issue at its convenience after the 4th of July an additional amount of capital stock, at the rate of $10,000 per mile of preferred stock and $15,000 per mile of common stock, as authorized by its articles of consolidation, for the construction of 50.43 miles of new railroad, viz.: 40.43 miles from the Superior Branch line in Wisconsin and 10 miles of Bayfield line in Winconsin, upon which lines consolidated bonds of the company were recently issued and listed. The amount of preferred stock will be $504,300, and the amount of common stock $756,400.

According to the report of the Comptroller the total funded debt of the city of New York on the 31st of May was $131,773,361.69, including $839,000 debt of the annexed district, and not including $12,274,734.40 revenue bonds, issued in anticipation of taxes. During the month, warrants were drawn against the city treasury for $4,017,147.50, making a total for the year of $18,512,482.52. Since the 1st of January, stocks and bonds have been issued to the amount of $11,586,974. 10. On the 1st inst. the Comptroller redeemed and cancelled $1,186,000 of the city bonds due and held by the sinking fund commissioners. The list included $31,000 four per cent. assessment fund bonds, $216,000 five per cent. (Riverside Drive) assessment bonds, and $939,000 five per cent. assessment bonds.

From the report of the Northern Central Railway Company, which has just been issued, we learn that the gross earnings of the main line for the year ending December 31, 1882, were $5,800,176.03, the operating expenses $3,842,323.05, and the net earnings $1,957,852.98; to which add receipts from dividends, interest and royalty on coal mines ($283,969.28)—making the total net receipts $2,241,822.26. From which is deducted payment to the Pennsylvania Railroad Company, interest, taxes, rents, equipment, etc., $1.802,425.36—leaving balance to credit of pro-

fit and loss $439,396.90. Compared with the previous year, the gross earnings of 1882 show an increase of $356,476.03, with an increase in expenses of $54,877.14, making the increase in net earnings $301,598.89, or 18.21 per cent.

The receipts into the Treasury of New Hampshire during the fiscal year ending June 1, 1883 (including $61,233.48 cash on hand at the commencement of the year) were $996,909.20; and the disbursements $792,286.71—leaving cash on hand June 1, 1883, $204,622.49. The liabilities of the State at the close of the year were $3,383,060.94, against which there were assets amounting to $204,909.09—making the net indebtedness $3,178,151.85, against $3,330,757.48 at the close of the preceding year, showing a reduction during the year of $152,605.63. The total revenue of the State during the year was $492,741.54 and the total expenses $340,135.89, an excess of revenue over expenses of $152,605.63, which corresponds with the reduction of debt.

The earnings of the Pacific Mail Steamship Company for the year ending April 30, 1883, were: from Atlantic line, $799,766.69; Panama line, $1,844,461.75; Trans-Pacific line, $715,731.57; Australian line, $353,199.97—total earnings, $3,713,159.98; the expenses were: Atlantic line, $545,854.16; Panama line, $1,212,143.93; Trans-Pacific line, $447,796.47; Australian line, $347,461.93—total, $2,553,256.49. To the above gross earnings add for subsidies and miscellaneous receipts, $389,604.71, making the total revenue $4,102,764.69; from which deduct total expenses, $3,190,506.79—leaving the net revenue for the year $912,257.90. The report, which was presented at the annual meeting of the stockholders on the 30th ult., stated that the company had liquidated all its floating debt, and now proposes to pay off the $1,000,000 seven per cent. bonds held by the Panama Railroad Company—the payments to be made at the rate of $20,000 per month. The net earnings during the past year have reached nearly five per cent. on the capital stock. The new steamers have been entirely paid for. The company owns twenty-six steamers, the aggregate construction cost of which was $12,261,041.62. The company now maintains agencies at Aspinwall, Panama, Acapulco, San Francisco, Yokohama, Hong Kong and New York, the total expenses of which last year amounted to $398,710.04. The liabilities amount to $21,295,287.87.

The Chief of the Bureau of Statistics at Washington reports that the total values of the exports of petroleum and petroleum products during the month of April, 1883, were $3,172,492, against $4,186,955 during the month of April, 1882. For the ten months ending April 30, 1883, $35,195,865, against $42,394,212 for the corresponding period of the previous year.

The interest-bearing debt of the United States, May 31, 1883, is $1,338,229,050; debt on which interest has ceased since maturity, $8,938,475.26; debt bearing no interest, $529,042,895.81; interest, $10,847,050.18—total debt and interest, $1,887,057,471.25. Of the debt bearing interest, $33,154,050 are bonds bearing interest at five per cent., continued at three and one-half per cent.; $250,000,000 at four and one-half per cent.; $737,584,100 at four per cent.; $303,132,900 at three per cent.; $358,000 refunding certificates, four per cent.; $14,000,000 Navy Pension Fund, four per cent. The debt bearing no interest consists of: Old demand and legal tender notes, $346,740,026; certificates of deposit, $11,805,000; gold and silver certificates, $163,494,271; fractional currency, $8,003,598.81. The cash in the treasury amounts to $317,868,062.34; and the total debt, less cash in treasury, to $1,569,189,408.91, against $1,574,079,885.51 on the first of May, 1883, a decrease during the month of $4,890,476.60, and a decrease since the 30th of June, 1882, of $119,725,051.81. The cash balance available, June 1, 1883, amounts to $131,549,531.42.

According to the monthly statement of the Chief of Bureau of Statistics at Washington, of the imports and exports of the United States, the excess of the value of exports of merchandise was as follows: Month ended April 30, 1883, $3,830,865; four months ended April 30, 1883, $54,671,198; ten months ended April 30, 1883, $109,246,667; twelve months ended April 30, 1883, $78,463,923. The total values of the imports of merchandise for the twelve months ended April 30, 1883, were $733,177,431, and for the twelve months ended April 30, 1882, $708,024,427, showing an increase of $25,153,004. The values of the exports of merchandise for the twelve months ended April 30, 1883, were $811,641,354, and for the preceding twelve months, $777,875,781—an increase of $33,765,573.

At a conference held on the 7th inst. between the representatives of the holders of the income bonds of the Central Railroad Company of New Jersey and Mr. Gowen, it was agreed that the former should first receive 10½ per cent. for back interest in 6 per cent. scrip, interest from May 1, 1883, convertible into stock of the company on and after January 1, 1885, with proper provision against duplication of interest and dividends for the same period. Second, that the present bond shall be stamped with an agreement that hereafter it shall draw 6 per cent. instead of 7 per cent.; that it shall not be paid until 1908, and that the holder on and after January 1, 1885, and until January 1, 1907, can convert it at par into stock at par, with proper provision against duplication of interest and dividend for the same period.

To secure an issue of $250,000 of first mortgage bonds, payable in forty years, with interest at the rate of six per cent. per annum, the Central Crosstown Railroad Company of this city has mortgaged its rolling stock, buildings, franchises, etc., to the American Loan and Trust Company of this city.

The earnings of the Boston, Concord and Montreal Railroad for the year ending March 31, 1883, were $920,195.43, the expenses $697,651.33, and the net earnings $222,540.10—showing an increase in earnings during the year of $17,288.58, with an increase in expenses of $28,493.79, making the decrease in net earnings $11,205.21.

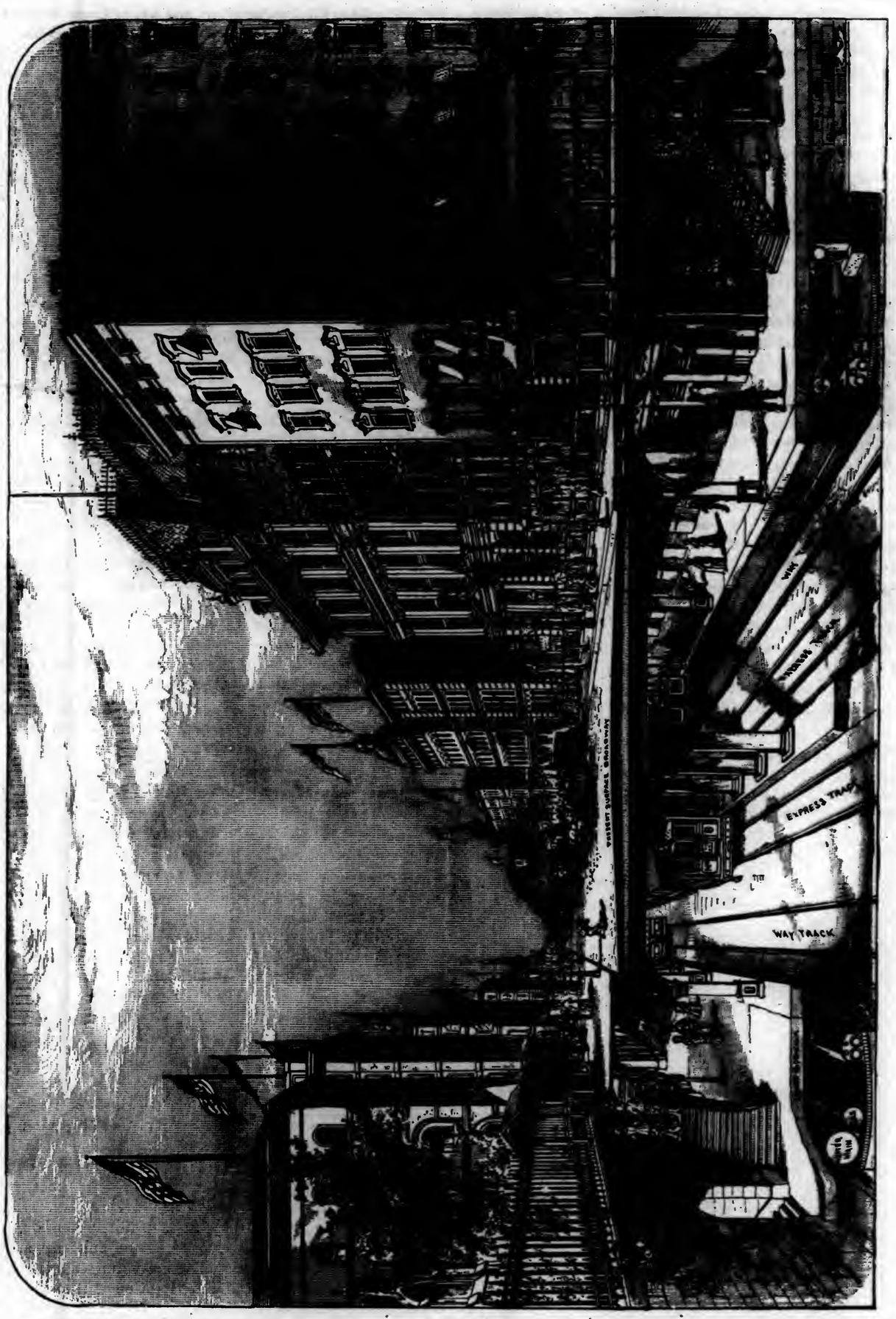
The gross earnings of the Ogdensburg and Lake Champlain Railroad for the year ending March 31, 1883, were $653,720.95, the operating expenses $450,758.06, and the net earnings $202,962.89, from which was paid interest to the amount of $184,594.75. Compared with the previous year the gross earnings show an increase of $34,442.56, with an increase in operating expenses of $12,288.30, making an increase in net earnings of $22,154.26.

From the report of the Chicago, Rock Island and Pacific Railway Company, which was submitted to the stockholders at their annual meeting in Chicago on the 5th inst., we learn that the gross earnings for the fiscal year ending March 31, 1883, were $12,189,902.81, the operating expenses $7,109,816.38, and the net earnings $5,080,086.43. To this is to be added the net cash receipts from land sales, amounting to $560,000, making a total net revenue of $5,640,086.43. After paying interest on the bonded debt, rentals of leased lines, and four quarterly dividends of 1¾ per cent. each, the amount of $1,300,000 was ordered carried over to the "addition and improvement account."

Cattle Injuring Railway Trains.

An ox was allowed by the negligence of its owner to stray upon a railroad track, and it threw from the track an engine and some cars and injured them. The company sued the owner for the damages in negligence and was defeated. On an appeal of the case (Annapolis and Elk Ridge Railroad Company vs. Baldwin) to the Court of Appeals of Maryland, the judgment was reversed. Judge Robinson, in his opinion, said: "The defendant is liable. The plaintiff is entitled to the unobstructed use of its road, and defendant admits that his ox was upon the track through his negligence. The injury was the direct result of his negligence. If the negligence is once admitted or established, it is no answer that the defendant did not foresee the injury, or that the damage was greater than he anticipated."

How to write well. First select your pen. See it has Esterbrook's stamp. With good ink, paper and application, the desired result will follow.



THE PROPOSED BROADWAY ARCADE OR BASEMENT STREET, NEW YORK CITY.

The Broadway Underground Railway.

WITHIN two decades three great public enterprises have been projected in New York City—the New York and Brooklyn bridge—the tunnel under the Hudson River connecting New York and Jersey City, and last but not least, the Broadway Underground Railway. The first is finished or nearly so, the second is in course of construction, and preliminary work upon the last is being pushed with vigor.

The line of the proposed Broadway Underground or Arcade

Railway is: Beginning at the Battery Park and Bowling Green, under Broadway, to Twenty-third street—there a branch will extend up Madison avenue to Harlem; thence along the Harlem river to a point near Kingsbridge; thence across the river, connecting with railroads on the northern and eastern sides of it. This branch will also connect with the Grand Central depot at Forty-second street. Another branch, beginning likewise at Twenty-third street, will extend up Broadway to Fifty-ninth street at the junction of Eighth avenue; thence along the Boulevard to 126th street, thence to connection of Hudson River Railroad.

THE PLAN OF THE ARCADE RAILROAD

is simply to make a double Broadway. The whole street will be excavated to the depth of about seventeen feet for a four track railroad, and twelve feet under the present sidewalks for duplicate sidewalks by the side of the railroad beneath, on a level with the platform of the cars. The roadway will then be replaced at its present level by arches of solid masonry rendered water-tight by impervious asphaltum coating, resting on iron columns, and covered with a solid wagon-way of the very latest and most approved pattern. This road-bed will never need to be disturbed until worn out. During the day the railroad will be lighted from above, through six feet width of open area on each side, which the law now allows adjoining every building and also through bull's eyes of glass along the curbstone, or the whole sidewalk may be made of glass, as in front of the "Florence" at Fourth avenue and Eighteenth street, and upper floors of many arcaded buildings in lower Broadway.

Besides the open areas, ventilation will be had through similar spaces at the corners of the street entrances and stairways. The stairs will be only twelve feet high, less than half the height of the average stairs of the Elevated Railways, while the cars will be rendered still more accessible by the elevators in the stores on every block, which will doubtless be sent down to the basement. At night the whole roadway will be rendered resplendent by electricity. Upon the lower road-bed will be built

FOUR TRACKS,

the two inside to be used for express trains, to stop only once in about a mile, and the two outside for way passenger trains, the trains upon which run as fast as the elevated cars now do. The express trains will run from the Battery to Harlem River in from fifteen to twenty minutes.

FOUNDATION OF BUILDINGS.

The foundation of every building on Broadway erected within the last twenty years is sufficiently low not to be disturbed by the proposed excavation. A few old buildings will have to be shored up and their foundations deepened, a common building operation nowadays. In fact, the foundations of the buildings would be far less disturbed by the Arcade plan with its shallow excavation, than by the construction of a tunnel road, such as the company now has the right to build, twenty-five or thirty feet under Broadway. Of course, in the light of the fact that Chicago has been raised bodily while business went on uninterruptedly in the buildings, and that in riding down Broadway one frequently sees thirty-foot excavations for new buildings adjoining thin side walls with insufficient foundation, it will not be seriously claimed that the matter of excavation is an obstacle to the construction of the Arcade Railroad. Indeed, the Commissioners themselves in their report against a tunnel road, which would encounter far greater obstacles, speak as follows on this point: "But it appears to be well and sufficiently proven that the present state of the science of engineering is such that a sufficient amount of time and money and the use of adequate means are the only limitations to the successful performance of the work proposed."

THE CONSTRUCTION OF THE ROAD

will be commenced by placing along the line of the roadway two iron bridges, as shown in the picture, of about 300 feet long, each 18 feet wide in the clear, and along the line of sidewalks corresponding bridges, each 12 feet wide; these bridges to be supported at intermediate points. The floor of these bridges will be elevated four feet above the grade of the street, and the difference in elevation overcome by a gentle ascent at each end. These trusses are skeleton frames, and will form but slight obstruction to the view, and will permit pedestrians to cross the streets at all places. The panels are made separate and bolted together, and may be taken down from one and added to the other with great facility.

Convenient access to and from the bridges will be provided for, and the work on the railway will be carried on beneath, without using the street either in the removal of the excavated ground or in bringing materials to construct the road; the completed arcade being ample for these uses, and affording abundant storeroom for all the purposes of construction.

The street in front of a good sized building would be occupied by the bridges and the workmen but a week or two, and during this time (by the plan proposed) the occupants of the building would suffer but little inconvenience, and the street travel but little obstruction.

There will be no interruption of the sewage system or of the water and gas supply along the route, but the water pipes, gas pipes, sewers, telegraph and telephone wires, electric light wires, pneumatic tubes and all devices for the cleansing of the streets and the accommodation of the public will be provided for in the Arcade structure itself, where they will be out of the way and yet perfectly accessible at any time for the purpose of adjustment or repair without disturbing the surface of the streets.

The President of the company is Melville C. Smith, a wealthy owner of real estate. The Trustees, recently elected, are Mr. Smith, William Windom, ex-Secretary of the Treasury; Jerome Fassler, Sr., of Whiteley, Fassler & Kelly, manufacturers of mowing and reaping machines at Springfield, Ohio; H. C. Gardiner, and Edward M. Clymer, President of the Buffalo, Bradford and Pittsburgh Railroad. Mr. Smith said recently that the Board would probably be enlarged by adding two or three prominent Broadway real estate owners.

THE ELEVATED ROADS,

the surface railroads, and the omnibuses at the present time are inadequate at certain hours of the day to supply proper accommodations for the people who fill them. Only about half of them can procure seats, and the others are obliged to stand. The underground road will relieve all this, and meet all possible demands of travel on this circumscribed, river-girt island for all time to come. It meets the fullest needs of rapid transit.

Comptroller Campbell has accepted a bond from the company to the amount of $100,000 which is to be forfeited to the city if the road is not completed from the Battery to Forty-second street, within four years from the filing of the bond. Mr. Smith intimates, according to their engineer's report, that it can be done by their method of construction in two and a half years.

OPINIONS OF ENGINEERS.

The following is the judgment of several eminent engineers: The Arcade provides complete accommodation for through and way transit of passengers and freight between the extreme limits of the island and along its main artery.

It furnishes an arcade avenue and promenade, well lighted and ventilated, convenient for pedestrians at all times, and with special advantages in warm, cold or stormy weather.

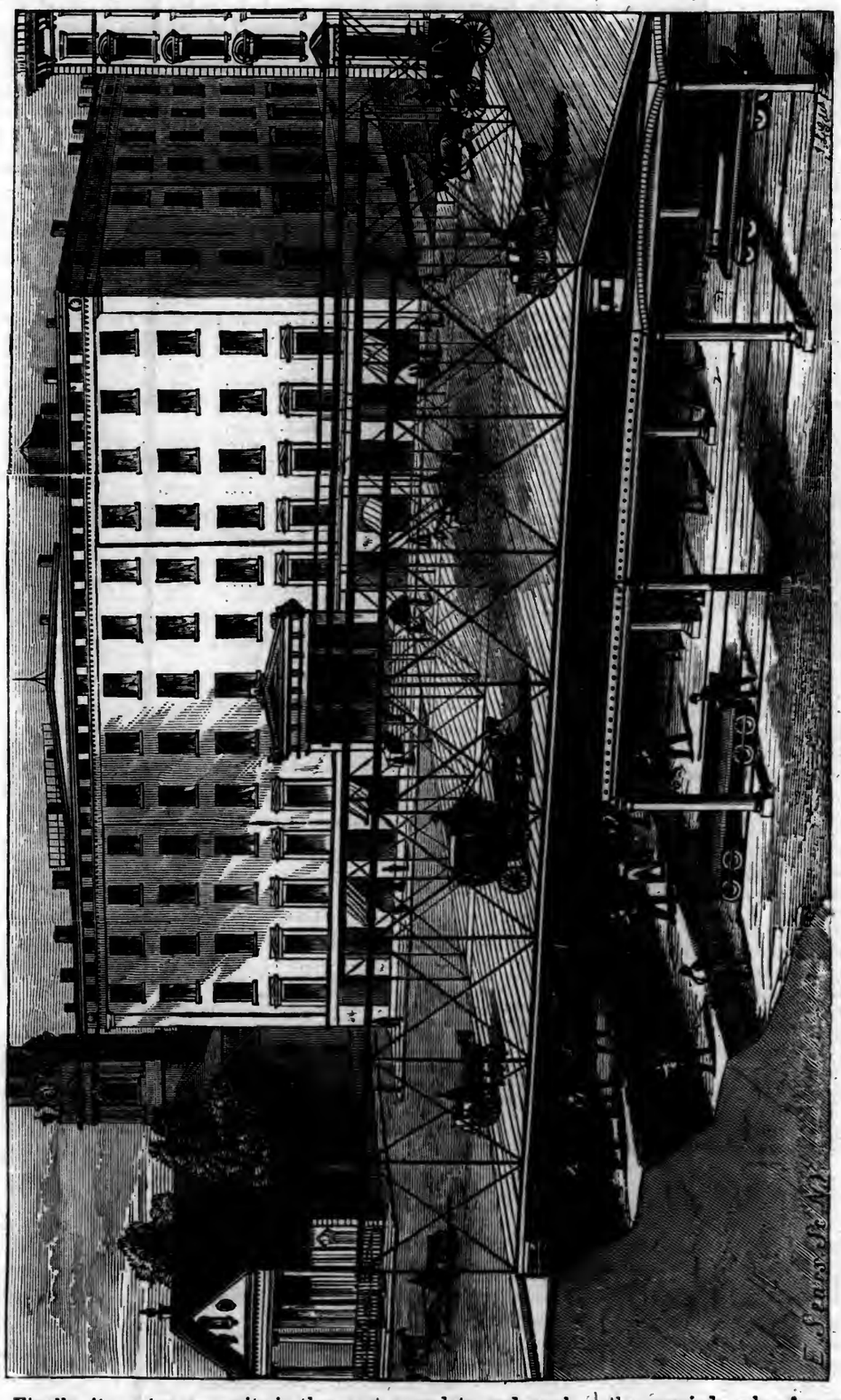
It can be constructed without interruption either to the travel on the street or the convenient use of the buildings adjacent,* and without endangering any of the structures along the street, and with arrangements for a better location of the water and gas pipes and sewers than now exists.

The route selected—namely, that along Broadway, is determined by the topography of the island.

*The accompanying sketch of a set of movable bridges by means of which these interruptions will be avoided, was designed by Mr. J. McAlpine.

It in no case occupies or injures any private property, but in nearly all cases greatly enhances the value of the property along its route.

There are no difficulties attending the construction of the work which cannot be overcome by engineering skill, and at a comparatively moderate cost.



MOVABLE BRIDGE FOR BUILDING THE ARCADE WITHOUT INTERRUPTION TO TRAVEL.

Finally, it meets a necessity in the most complete and unobjectionable manner.

Signed—George B. McClellan, John B. Jarvis, William J. McAlpine, Silas Seymour, Egbert L. Viele, Charles H. Haswell, Julius W. Adams, H. G. Wright, Sylvanus H. Sweet, John Newton, I. F. Quimby.

No other city in the world so needs an express railroad throughout its entire length, for there is no other city in the world that is so long and narrow, confined by wide rivers, with the business houses at one end, and the residences so far away at the other, receding in a direct line further and further every year. The promoters of the Arcade road

CLAIM FOR IT THE FOLLOWING ADVANTAGES:

1. It can carry more than 1,000,000 passengers a day at the highest practicable rate of speed.

2. It will combine all the possible conditions of safety.

3. It will have plenty of light and air.

4. It will take none of the surface of the island, and instead of destroying or injuring property will improve and increase it. No matter what remuneration the owner may receive, the destruction of property is a public injury and absolute loss.

5. It will have four times the capacity of any other rapid transit road. It will equally accommodate way travel and through travel, as no double-track can do, frequent stoppages being incompatible with fast travel, and infrequent stoppages inconvenient for way travel.

6. It will furnish to the public free of charge a convenient and always accessible vault for all sewers, pipes, wires and other paraphernalia of the distribution service, which have become, both in the air and in the ground, an intolerable nuisance in the down-town streets.

7. It will provide for easy entrance and exit. And finally,

8. It will create a new sub-surface street and new sidewalks, with twenty-five miles of new basement stores, and by removing trucks and omnibuses from the present surface of Broadway, leaving it free for carriages on a dry and firm pavement, will make it the most beautiful avenue in the world.

This article cannot more fitly conclude than with the following extract from an elaborate report made by a board of engineers of eminence and ability: "Eighty millions of people cross the ferries annually to the lower end of the island, and 200,000,000 come on railways and steamers. It is for this great multitude, and the myriads who for years to come will throng the busy marts of the world's great metropolis, that we are to provide. What the Erie Canal was to the Empire State; what the Pacific Railway will be to the continent; what the Atlantic cable is to the world—great necessities of modern civilization—such will be the Arcade Railway to the city of New York." And when it

shall have been completed, and thronged through all the hours of the day and night, instead of being regarded as singular in conception and a wonder in execution, the only marvel will be why it was not done before.

Chicago and Alton Railroad.

THE earnings of the Chicago and Alton Railroad Company for the years ending December 31, 1881 and 1882, were as follows:

	1881.	1882.
From passengers	$1,697,541 44	$1,973,100 66
From freight	5,546,869 44	5,948,123 31
From express	147,399 20	159,090 46
From mails	137,996 35	119,816 93
From miscellaneous	27,933 99	15,363 76
Total earnings	$7,557,740 42	$8,215,495 12
Expenses, viz:		
Conducting transportation	$1,261,139 24	$1,265,862 00
Motive power	1,121,048 10	1,221,417 27
Maintenance of way	1,190,932 75	1,273,125 43
Maintenance of cars	344,367 95	509,362 23
General expenses	232,225 21	216,114 60
Total expenses	$4,149,713 25	$4,485,881 53
Net earnings	$3,408,027 17	$3,729,613 59
Add balance from previous year	1,500,410 10	1,442,440 66
Received from interest on bonds, dividends, stocks, etc	306,791 13	332,547 24
Total net income	$5,215,228 40	$5,504,601 49
Disbursed as follows:		
Interest on funded debt	$762,001 40	$761,122 23
Dividends, March and September	1,077,976 00	1,083,080 00
Rent Joliet and Chicago Railroad	131,355 00	117,615 00
Rent St. Louis, Jacksonville and Chicago R. R.	399,662 65	424,000 00
Rent Louisiana and Missouri River Railroad	169,188 95	188,942 37
Rent Kansas City, St. Louis and Chicago Railroad	333,788 00	333,977 00
Rent Mississippi River Bridge	63,000 00	63,000 00
Paid Wiggins Ferry Co	136,763 36	.....
Paid principal of Joliet and Chicago Railroad mortgage bonds	.....	306,000 00
Paid sinking fund	73,980 00	.....
Paid for sinking fund bonds purchased	.....	79,574 06
Paid from this account for real estate, buildings, tracks, etc	431,643 74	71,221 56
Suspended accounts written off	21,758 89	18,366 12
Paid State, County and municipal taxes	171,661 75	198,621 97
Total disbursements	$3,772,787 74	$3,645,520 31
Balance, December 31	$1,442,440 66	$1,859,081 18

Compared with the year 1881, the gross earnings of 1882 show an increase of $657,754.79, with an increase in operating expenses of $336,168.28, making the increase in net earnings $321,586.42.

At the close of 1881 the length of main line and branches was 846.36 miles; length of second main track, 60.12 miles; length of side track, 168.87 miles—total length of all tracks, 1,075.35 miles. At the close of 1882 the length of main and branch lines was as follows: Chicago to Joliet (leased), 37.20 miles; Joliet to East St. Louis, 243.50 miles; Coal City Branch, 29.76 miles; Dwight to Washington and branch to Lacon, 79.80 miles; Roodhouse to Louisiana, 38.10 miles; St. Louis, Jacksonville and Chicago (leased), 100.80 miles; Mexico to Kansas City (leased), 162.62 miles; Upper Alton Line, 7.40 miles—total, 849.78 miles; to which add 39.64 miles of second track between Chicago and Joliet, and 20.48 miles between Joliet and East St. Louis, and 173.58 miles of sidings—making the length of all tracks, 1,083.48 miles.

The equipment of the road at the close of each year was substantially the same, viz: 213 locomotives; 105 cars used in passenger trains, 19 Pullman sleeping cars, 3,223 house, 1,348 stock, 1,350 platform and coal, 10 dump, 97 drovers' and 16 tool and boarding cars.

The number of miles run by passenger trains in 1882 was 1,550,018, and by revenue freight trains, 2,513,523—a total of 4,063,541, against 3,903,362 in 1881, an increase of 160,179.

The number of tons of revenue freight transported in 1882 was 3,522.840, of which 772,975 was through and 2,749,865 local; in 1881 the freight tonnage was 3,275,004, of which 799,051 was through and 2,475,953 local—showing a decrease in through freight of 26,076 tons, and an increase in local freight of 273,912 tons, the total increase in freight tonnage being 247,836. The number of tons of paying freight carried one mile in 1882 was 474,823,908, against 447,009,977 in 1881, an increase of 27,813,931 tons. The tonnage of coal transported was 1,366,641, an increase over the previous year of 176,400 tons. The average rate per ton per mile on revenue freight was 1.261 cent, against 1.241 cent in 1881. Average distance each ton was carried, 134.78 miles; do. in 1881, 136.49 miles.

The total number of passengers carried in 1882 was 1,666,991, of whom 123,600 were through and 1,543,391 local; in 1881 the number carried was 1,495,606, of whom 123,743 were through and 1,371,863 local—a decrease in through passengers of 143, and an increase in local passengers of 171,528, the total increase in passengers being 171,385. Number of passengers carried one mile in 1882, 101,150,959; do. in 1881, 92,847,464, an increase of 8,303,495. The average rate per mile paid by all passengers in 1882 was 1.951 cent, against 1.828 cent in 1881. Average distance traveled by each passenger, 60.72 miles; do. in 1881, 62.07 miles.

The income bonds of the company, which are stated in the annexed balance sheet at $1,096,000, had, with the exception of a few bonds not presented, been paid at maturity by the application of funds provided for that purpose before the close of the year 1882. There were redeemed and canceled on account of the sinking fund during the year $69,000 of the six per cent sinking fund gold bonds of the company. The $306,000 mortgage bonds of the Joliet and Chicago R. R. Co., on which this company has heretofore paid interest at the rate of eight per cent per annum, matured July 1, 1882, and were redeemed and canceled. The total amount of bonds redeemed during the year was $1,458,000; and the total amount of common stock issued and sold to shareholders was $1,323,200.

GENERAL BALANCE SHEET, DECEMBER 31,

	1881.	1882.
Cost of road and equipment	$20,222,700 88	$20,222,700 88
Coal City Branch construction	500,798 73	508,461 35
Western Division construction	1,116,724 91	1,116,724 91
Louisiana Branch construction	1,389,537 92	1,389,537 92
Cash on hand and due from agents in transit	344,830 95	2,356,154 79
Supplies, machinery and tools	827,979 22	605,037 18
Bills receivable—including, in both years, notes of Louisiana and Missouri River R. R. Co. for $311,187.96	412,671 54	380,581 07
Trustees sinking fund mortgage	22,626 71	22,626 71
Sundry other trusts	206,475 84	83,875 84
Stocks and bonds held by the company	3,765,421 40	3,732,221 40
Income bonds purchased	.....	15,500 00
Sinking fund bonds purchased	39,930 75	4,636 69
St. Louis, Jacksonville and Chicago Railroad construction account (Upper Alton Line)	145,455 40	316,022 92
Louisiana and Missouri River—general account and accrued interest	109,942 84	89,374 27
Kansas City, St. Louis and Chicago R. R. Co	5,252 40	.....
Kansas City Union depot	1,000 00	6,666 67
U. S. Government Post Office Department	29,620 71	29,646 05
Balance due from foreign roads, individuals and companies, less amount due to other companies, etc	43,358 93	.....
Total	$29,183,329 13	$30,879,768 65
Capital stock, common	$11,181,472 00	$12,504,672 00
Capital stock, preferred	2,425,400 00	2,425,400 00
First mortgage bonds	2,400,000 00	2,400,000 00
Income bonds	1,096,000 00	1,096,000 00
Sinking fund gold bonds	2,874,000 00	2,805,000 00
Consolidated sterling bonds	4,379,850 00	4,379,850 00
St. Louis, Jacksonville and Chicago first mortgage bonds assumed	564,000 00	564,000 00
St. Louis, Jacksonville and Chicago second mortgage bonds assumed	188,000 00	188,000 00
Louisiana and Missouri River R. R. bond acc't.	439,100 00	439,100 00
Bonds unissued	30,000 00	30,000 00
Stock unissued	4,572 00	4,572 00
Sinking fund bonds paid and canceled	600,000 00	600,000 00
Sinking fund gold bonds redeemed	126,000 00	195,000 00
Trustees' cash	3,241 39	3,241 39
Unclaimed dividends and coupons	1,258 46	1,258 46
Received from sales of locomotives	62,900 00	27,400 00
Vouchers and pay rolls to December 31	555,754 21	481,014 91
Rent accrued on leased lines to December 31	142,741 67	142,741 67
St. Louis, Jacksonville and Chicago R. R. Co	128,644 88	134,426 46
Kansas City, St. Louis and Chicago R. R. Co	.....	6,363 70
Kansas City, St. Louis and Chicago construction account—unexpended balance	268,823 72	251,821 83
Amount appropriated from the K. C., C. & St. L. construction fund for equipment, etc	265,216 80	265,216 80
Unclaimed freight and baggage	2,321 06	2,321 06
Depot and depot grounds	200 00	200 00
Missing sinking fund coupons	70 00	70 00
Land Trustee	1,322 28	2,431 10
Balance due to foreign roads, individuals, and companies, less amount due from other companies	.....	70,586 09
Income account	1,442,440 66	1,859,081 18
Total, as above	$29,183,329 13	$30,879,768 65

The office of the company is at Chicago, Ill. The officers and directors are:

President—T. B. BLACKSTONE.
Vice-President—JAMES C. MCMULLIN.
Directors—John F. Slater, George Straut, James C. McMullin, John Crerar, Lorenzo Blackstone, John J. Mitchell, T. B. Blackstone, John B. Drake, Morris K. Jesup.
Secretary and Treasurer—CHARLES H. FOSTER.
General Manager—CHARLES H. CHAPPELL.
General Superintendent— W. F. MERRILL.
Chief Engineer—K. F. BOOTH.
Purchasing Agent—A. V. HARTWELL.

TRAMWAY DEPARTMENT.

[This department of the AMERICAN RAILROAD JOURNAL is devoted to the interests of Street Railways; and communications, suggestions and items of information relative to their organization, management and appliances are solicited by the editors. All communications should be accompanied by the name and address of the writer. The English nomenclature of "Tramway" is adopted in this department as being of greater convenience and more specific in its meaning than "street railway," though in allusion to individual organizations we shall preserve their corporate titles. It is our hope to nationalize the term Tramway, which is now generally used in every English speaking territory with the exception of the United States.]

UNTIL the publication of a Tramway Department in this Journal, with the exception of an occasional paragraph in the newspapers, the public were left uninformed as to street railways considered as business enterprises. And now, while arrays of authenticated figures present the extent, outlay and profit of railroad enterprises to a nicety, it is vain to search for corresponding information concerning the vastly important interest concerned to provide the public with cheap and convenient street travel. Of course, this remark has no application to the elevated railroads of New York, which are an exceptional provision and more properly classed with the great railroad system of the United States. But information about street railways is difficult to procure, and, at present, it is impossible to print the figures which would give a complete view of the whole business and, therefore, of course, of the very numerous and diverse interests comprised in it. Seeing that the interests of those who supply the public with said service, and of the public in the second place, would be advanced by the collection and comparison of the details of such service, we are pleased to record, on the authority of a gentleman eminent in the street-car business, that before long a blank form will be sent out, at least to those roads that are members of the American Street-Railway Association, requesting data in reference to equipment and construction, so that useful and profitable comparisons can be made relative to the cost of equipment and construction in various localities and with the use of different materials, especially, also, in regard to the cost of feed for horses. Another object sought in the proposed sending out of said circular will be to compare the cost of horse power with that of steam, whether by dummy or the cable system. As we are quite sure that the value of such inquiry is patent to all interested in street-railway enterprises, there is no necessity of our enlarging upon the advisability of their submitting as full answers to the proposed inquiries as they can, with the view to the common advantage of all engaged in the business. The greater the perfection of tramway service attained, the higher must prove the public appreciation of its importance and convenience, and the profit of the business will be increased accordingly. We regard the announcement we are enabled to make as one of great importance, and shall await the results of the proposed inquiry with hopeful interest.

IN his veto of the Street Railroad Bill, Governor CLEVELAND gives as his principal objection to it that it applies too largely to interests in New York City. In his memorandum of disapproval he expresses the opinion that "it cannot be difficult to frame a bill which in spirit, as well as in strict construction, would be a general law, protecting all localities alike, and avoiding the evils sure to follow a furtive attempt, under the guise of a general statute, to answer only private and local purposes." The difficulty seems to be to reconcile loyalty to the Governor's wholesome doctrine with the profitable grinding of the proverbial ax.

Traction Railways.

THE receipt of a pamphlet entitled "Cable Railway Company's System of Traction Railways for Cities and Towns," and the interest attaching to the construction of a traction railroad over the New York and Brooklyn Bridge, give opportuneness to the presentation of certain facts collected upon a review of the pamphlet the title of which is quoted.

It is a publication of the Cable Railway Company of San Francisco, which was incorporated April 16, 1881, for the purpose of introducing throughout the United States the system of cable railways, matured by Mr. A. S. Hallidie, and as operated in San Francisco. The company is the exclusive owner of sixteen United States letters patent, including all those granted to Mr. A. S. Hallidie. It has provided traction railways in San Francisco and Chicago, on a grand scale, and with results giving superior street travel to the inhabitants of those cities, and, as will be seen presently, a profitable return to the various companies engaged in operating said railways.

Mr. Hallidie's system was first put in use by the Clay Street Hill Railroad Company, in San Francisco, August, 1873, since which time it has been constantly running, and has been found to answer all requirements, and to exceed the expectation of engineers and others who had examined the plans of the inventor. It is adapted to all kinds of metropolitan railroading, where the surface of the streets has to be kept free from obstructions and open to ordinary traffic, where locomotive steam engines are not permitted, or where the streets are so steep as to make the use of horses difficult or impossible. The system consists of an endless wire rope placed in a tube below the surface of the ground, between the tracks of a railroad, and kept in position by means of sheaves, upon and beneath which the rope is kept in motion by a stationary engine, the power being transmitted from the motor to the rope by means of grip or other suitable pulleys, and from the rope to the cars on the street by means of a gripping attachment fixed to a grip-car or dummy, and connected by a thin bar, which passes through a narrow slot in the upper side of the tube.

It presents no impediment to ordinary travel. The rope is grasped and released at pleasure by a gripping device attached to the passenger car, and controlled by a man in charge. The car is more smoothly started than by horses, and instantly stopped on any part of the road; its mechanical construction is simple and easily controlled, and on the streets of a city it does not frighten horses or endanger lives. Wire rope, we may add, without which it would be difficult to work cable railroads economically and successfully, was the invention of Mr. Andrew Smith, a native of Scotland, who experimented with the use of metal wire for ropes in 1828, and took out his first patent in Great Britain, January 12, 1835. Since then the material from which wire is made has been improved, until now steel wire is made capable of sustaining a tensile strain of 120 tons per square inch area.

As to the all-important question of cost, our authority informs us that the total cost per mile of equipment and construction of the Hallidie cable railway double track, is $51,899.56. If the costs of administration, office work and extras are considered to be the same under both the horse and cable systems, an elaborate comparison between them places the running expense of a horse road, three miles, double track, speed four and a half miles per hour, thirty-two cars, headway two and a half minutes, at $138,880.00, or $380.50 per day, which, at five cents per passenger, would require 7,610 passengers per day to pay expenses. If the line carried its full seating capacity, and ran eighteen hours per day on two and a half minutes headway, it would carry daily

9,504 passengers at five cents, equal to $475.20. The annual running expenses of a cable railway, three miles double track, speed six miles per hour, twenty-four cars and twenty-four dummies, leaving every two and a half minutes, are found to be $88,246.71, or $50,633.29 less than the expenses of the horse road. Moreover, the cable road, in the same number of hours, under the same headway, would seat 19,008 passengers, at five cents, $950.40, making a daily earning of $475.20 more than the horse road, or an actual gain of $171,072, which added to the $50,633.29 saved in running expenses, would effect a total annual saving by the cable system as compared with the horse system, of $221,705.29.

These figures demonstrate the wisdom of horse-car companies looking with attention into the subject of cable railways. We cordially commend to their examination the pamphlet reviewed in this article.

The One-Horse Car.

THE following letter, addressed to the publishers by the John Stephenson Company, speaks for itself. We believe in giving both sides a hearing:

No. 47 E. 27TH ST., NEW YORK, June 2, 1883.

Phenix Publishing Co., No. 245 Broadway, New York City.

GENTLEMEN:—We regret to see that the AMERICAN RAILROAD JOURNAL is misleading the public regarding the use of small tramcars. You say the popular prejudice is strong against them everywhere." The best statistics and sources of information accessible to us show that in the United States and Canada there are about 428 tramways, of which Canada has about a dozen. Of these 428 roads, 279 are operated with small ("bob-tail") cars and 149 are operated with large (conductor) cars. A reference to our order-book for the year 1882 showed that two-thirds of our orders were for small cars. The small car system is a boon to the public because: One. Tramways accommodate the public, where otherwise they could not exist. Two. The accommodation is better because usually three (3) small cars are used successfully where the effort to sustain two (2) has proved a failure. Three. Economy of time equal to fifteen to twenty per cent., because the small cars make fewer stoppages, and being lighter, are stopped and put in motion more quickly, and Four. Merciful to horses. Two horses seldom start in unison. In the bob-tail car the one horse easily does the work, with better footing in the track.

Coaches to Connect With Street Cars.

THE Wilmington City Passenger Railway Company will run a coach line on Market street from Twenty-third to Tenth, where a connection will be made with the street cars. Passengers will be carried between Twenty-third and Market streets and the P. W. & B. railroad station, the Middle Depot or the Eleventh street bridge for a single fare. One coach has been put on the line. The number will be increased as rapidly as other coaches can be got ready until they run on fifteen-minute time and connect with every alternate car on the passenger railway, over which the cars will begin to run on their new schedule with seven and a half minutes' interval in a few days.

Steam for Street Railways.

THE London Street Tramways Company, one of several companies doing a street railway business in the English metropolis, has adopted compressed air engines to propel its cars. Recently the company made a trial of the Mekarski air engines before a large party of gentlemen interested in street railways. The engine has been used independently in England for some time, but as applied to street railway cars has only now been introduced. It has, however, been used very successfully for the last four years at Nantes. The engine was applied to one of the ordinary cars of the company, and the car ran smoothly and well over the whole line, including some steep gradients and sharp curves. The speed obtained was satisfactory, and it was found that the car could be stopped in little more than its own length. There is no steam visible, and no disagreeable smells apparent. The Tramway Company's opinion upon the financial aspect of the question may be judged from the fact that they have resolved to fit the Mekarski engines to all the cars, thus entirely superseding horseflesh by compressed air. We commend the idea to the notice of some of our own street railway managers.

Running Street Cars to the Bridge.

A NEW street car connection with the Bridge has been made in Brooklyn by the Prospect Park and Coney Island Railroad Company, whose street car line runs from Fulton Ferry to Ninth avenue and Twentieth street, principally in Park and Vanderbilt avenues. A force of men laid a track in Concord street, from Bridge street to Washington street, connecting the line already in use in Bridge street with the line of the Brooklyn City and Newtown Railroad Company in Washington street, running past the Bridge terminus. A. R. Culver, president of the company, said that the cars would still run on the old route down Gold and Front streets to Fulton Ferry, returning in Water, Bridge and Concord streets, to Gold street.

The Brooklyn City Railroad Company is preparing its new car-stand adjoining the Sands Street Bridge Station on the west side. Rails and switches will be laid shortly. The Atlantic Avenue Railroad Company is grading the ground for its car-stand at the southeast corner of Sands and Washington streets, and will put down the tracks in a short time.

Market Street Cable Railway, Philadelphia.

CHIEF SURVEYOR SMEDLEY, Chief Commissioner Estabrook and Chief Engineer Ludlow, of the Survey, Highway and Water Departments, yesterday examined the plans for a cable road on Market street, submitted by President Widener and Engineer George Rice. President Widener explained that the road would be similar to that of the Union line on Columbia avenue, and would involve an outlay of $3,000,000. The conduit would be of wrought iron and the space between the tracks paved with cubical blocks. Highway Commissioner Estabrook, while in favor of the plans, desired to know if the clicking noise noticed in cable roads could be obviated. He was assured by Engineer Rice that this would be overcome by laying the conduit two feet nine inches below the surface of the street. The Department heads expressed satisfaction with the plans, but postponed formal approval until the District Surveyors submitted fuller plans, showing the exact location of the road, and the water and gas pipes and sewers with which it would come in contact.

Legislation for Cable-Power Railway.

OF course, the street railway companies should be kept within proper city regulation by all reasonable means; but there is such a thing as carrying restrictive measures rather too far. This is the case with an addition to Senate bill No. 111 now in the House, which is intended to enlarge the General Corporation act of 1874 so as to admit the formation of companies to furnish motive-power for cable railways. If it is the will of the Legislature to encourage the formation of such companies under a general law, as it should be, then the authority should be granted without any hindering restrictions that must defeat the main purpose of the measure. There can be no doubt that the cable method of propulsion is the best substitute for horse-power yet brought into operation for street railways; there is equally no doubt that it must inure to the benefit of the public in sundry ways; it is

reasonably certain that it cannot be largely applied in Philadelphia for a long while to come unless the Legislature extends the General Corporation law so as to authorize companies to furnish that kind of power; but such extension will be of no avail if the company to furnish the power is hampered by the condition that its customer shall charge no more than five cents per passenger, whether carried one mile or seven. The power company will simply not be formed under such restrictions, and the main purpose of the legislation will be defeated. A general law of the kind proposed is not the place for such details. The authority should be granted pure and simple. That is the business view of the matter.—*Public Ledger, Phila., May* 23.

List of Recent Patents for Inventions Relating to Tramways.

277,564. Guard for Street-Cars: Robert J. Good, Terre Haute, Ind. Filed July 14, 1882.

277,793. Sash-Holder for Street-Car Windows: I. N. Walter Sherman, Des Plaines, Ill. Filed Dec. 9, 1882.

278,031. Stone Pavement: Andrew McKinley, St. Louis, Mo. Filed Jan. 16, 1883.

278,044. Wire-Rope Railway: William S. Ray, San Francisco, Cal. Filed May 6, 1881.

The Pike's Peak Railroad.

A TRAMWAY is to be built up Pike's Peak, which will overshadow the Mount Washington railway. The plan is to construct three of these tramways, each nearly three miles long, one beginning at the end of the other. The first will start from the rear of the iron spring at the Manitou, and the last will be terminable in front of the signal station on Pike's Peak, at an elevation of 14,200 feet. The supports will be made of trees not less than eight inches in diameter, and about twenty-four feet high, braced above and below. On these an endless wire cable of one inch diameter will revolve, and upon which will be fastened, at intervals of about 100 feet each, a large covered arm chair, in which two persons can comfortably sit. This will be suspended about eight feet from the ground, and pass at entering and discharging points along a movable platform to load and unload without stopping. The lower section will be propelled by an engine at the lower end. The center one will be driven by water power, utilized on the mountain side through a turbine wheel, and the third by an engine erected on the summit of the peak.

Compressed Air as a Motor.

IN connection with new motors for street railway purposes an interesting report comes from London of a successful trial of a tram-car worked by compressed air upon the system of M. Mekarski, of Paris. The test was made on the tracks of the London Streets Tramway Company, which extend a distance of two miles. In appearance, the car is described as differing very slightly from the ordinary street car. With the exception of two small jar-shaped vessels on the front platform there is nothing in the way of machinery visible. By the means of pumps the air is passed into reservoirs, from which the tanks under the car are charged to the necessary pressure. It is claimed that under favorable conditions the car can run a distance of ten miles without recharging. The experiments were made with forty persons on board, and there was but one opinion as to the smoothness and ease of working, and the thorough control over the regulation of speed as well as over the starts and stoppages.

Planking for Railroad Crossings, Etc.

MR. S. T. WILLIAMS, of Red Bank, New Jersey, has introduced and is supplying an improved planking specially adapted for railroad crossings, flooring for stations and freight houses, and, in short, for all places in which there is a great amount of heavy trucking. His improvement is an economical one, costing no more than ordinary planking with the addition of the value of the iron used in it. The flooring or planking is made of any thickness required. To prepare the planking to receive the T iron, it is run through a planer, set to make a groove on each edge of it, at a suitable distance from the top, and so as to receive the lower handles of the T iron, which is reversed thus ⊥, so that its center portion comes up even with the upper edge of the planking. The iron answers several purposes: it prevents the planking from being cut into by heavy trucks, gives a good foothold to the horses, stiffens the flooring, keeps the planking even and greatly increases its durability.

Mr. Williams gives prompt attention to all inquiries concerning his valuable improvement.

ANOTHER electric railway is building in Germany. It will connect Frankfort-on-the-Main with Offenbach, eight miles away, and the dynamos will be driven by steam engines stationed at a village half way between the termini.

THE Market Street Passenger Railway Company announces its intention of entering into a contract for laying the cable road as soon as the Mayor signs the ordinance. It is understood he favors the new system.

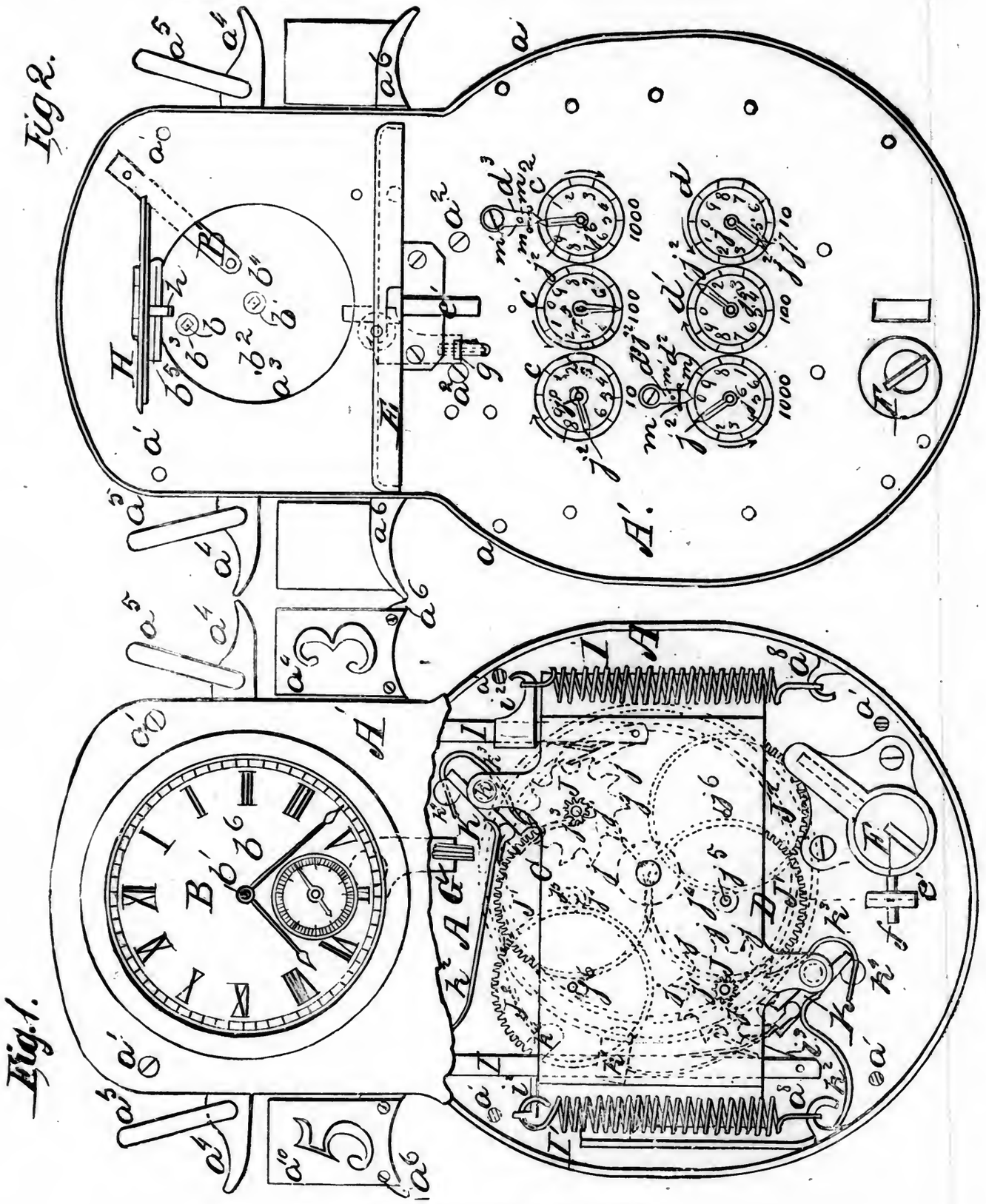
THE Citizens' Passenger Railway Company is said to be taking a great deal of travel from the West Penn. and the A. V. railroads, since it is running to Sharpsburg. The round trip on the latter line from Sharpsburg to the city is eighteen cents, and on the former twenty cents, not including toll, by parties doing business in Pittsburgh; while on the street cars, if tickets be purchased for the round trip, which includes the tolls, only sixteen is charged.

AN immense wire cable, 10,000 feet long and weighing twenty-six tons, has just been made at the Hallidie Wire Works, San Francisco, Cal. It is one and one-quarter inches diameter, with a center of manila. It is designed for stationary traction of the street cars on the Market Street Railway.

CHICAGO has twenty miles of cable railroad, with 174 cars, and the steam engines do the work of 1,970 horses. The running time between the court house and city limits, a distance of four miles, is twenty-five minutes less than when horses were used.

OCCASIONALLY the experienced rider in street cars finds the announcement of the destination of the vehicle in which he has taken his place, conspicuously posted up within it. This is so rare an occurrence, however, as to emphasize the omission of what would be a great convenience to female passengers particularly, whose fear of mistake and nervous questioning of the conductor are a matter of course in the every-day history of the service as it now generally exists; that is, without that aid to composure of mind suggested in the premises.

THE construction of the Norwood District Tramways, England, has been commenced, the line being laid to continue the dead ends of the Croydon tramways. The construction is of general interest from the fact that it is intended to use mechanical power to draw the cars. The directors have decided on a system which is in use at Dusseldorf, and will introduce to this country a fireless locomotive. The engine moves without fire, noiselessly, and without smell. There is no fire-box, no escape of steam, and no sulphurous fumes to contend with. The steam is generated in a stationary boiler, and charged into the locomotive reservoir at a pressure of fifteen atmospheres, passing through water into this reservoir, the whole being superheated. The storage of heat is sufficient to give the power necessary to drive the engine for ten miles, which will be ample for the requirements of the new line. The engine can be driven up a gradient of one in twelve and a half, with nine tons behind it, with ease. The Norwood lines have several short and steep grades, so that it is expected every requirement will be met by the Dusseldorf system.



RICHARDSON'S ALARM FARE REGISTER,

Alarm Fare-Register.

WILLIAM J. RICHARDSON, OF BROOKLYN, N. Y., INVENTOR.

THE foregoing sketches, being full size views, clearly show the latest patented invention for the registering and accounting of fares by conductors on street railroads or tramways.

Figure 1 is a front view, the cover below the watch being broken away in order to exhibit the interior parts. Fig. 2 is a rear view, showing the cover in rear of the watch, and the cover of the registering-dials open in order to exhibit to view the parts covered thereby.

The inventor is the Secretary and Treasurer of the American Street-Railway Association. Since the organization of the Atlantic Avenue Railroad Company of Brooklyn, eleven years ago, he has been Secretary of the Company, and has had under his especial supervision the examination of conductors' returns and the means used for the detection of dishonest employés.

The Atlantic Avenue Railroad Company has adopted this alarm-register as its standard. The registers have been in course of construction for some time past, and as soon as completed will be placed on its lines. This company was the first east of Buffalo to adopt the bell-punch in 1872, and has continued its use uninterruptedly ever since.

It has been a matter of serious question on the part of railroad managers as to whether they should oblige a conductor to use a stationary register in a car, which might be tampered with in the conductor's absence, by persons maliciously inclined.

This apparent unfairness as between man and man has very reasonably had weight when the question of the adoption of stationary registers has been considered. In case of a fire on the line of a road, with several lines of hose stretched across the tracks, and the consequent transferring of passengers from one car to another, there must of necessity be great embarrassment, even to the extent of neutralizing, for the time being, the good results endeavored to be obtained by the use of this form of check on the conductor's returns.

When the conductor is furnished with a portable fare-register, as it is carried by him, it cannot be tampered with, while his accounts in case of a fire on the road can be kept perfectly correct at all times.

The main objection heretofore to portable registers, has arisen from the fact that the alarm-bell has been so small that it has been possible for "dummy-bells" to be secreted either in the hand or about the clothing of the conductor, so that by its use the passenger and counter have been deceived and the company mulcted.

In the above register, or rather that which is in course of construction, and for which an additional patent is ready to be issued, the bell for announcing the collection of an adult fare is three inches in diameter, and sounds almost as loud as the largest stationary register-bell. The fare is registered immediately before the bell is rung, and before it is possible for the bell to be rung.

As all children under twelve years of age are carried inside the car and never on the platforms, a much smaller bell is used in connection with half-fares. This bell, however, is one and-a-half inches in diameter, and is as large as the bell used in the "bell-punch."

Any one who has had intimately to do with time inspection, knows how difficult it is to find a conductor with a watch that is worth carrying. All roads require conductors to have watches. These watches are oftentimes as useless for the purpose for which watches are made, as was the countryman's turnip. If running, they are unreliable; and if not, they have just "run down," "broken," or are "at the watchmaker's getting fixed," when the time-inspector would compare their time with his own "chronometer." The average conductor is generally too poor to buy a good watch, and obeys the "letter of the law," in carrying the semblance of a watch. The importance to horseflesh of having cars run on time cannot be over estimated. The curse of "loafing" goes hand in hand with "knocking-down."

In this register, the watch-movement is a superior Waltham, carrying *standard* time, and is so completely enclosed in a case that it can be wound and set in the company's office only. A heavy crystal covers the dial. Under no circumstance can the conductor get at the movement to interfere with it.

The purpose of the watch, however, is two-fold. The register is suspended on a line with the passenger's vision, and as the time of day is always a novelty, the passenger's attention will be invariably attracted to the watch. If the passenger carries a watch, he will be interested in comparing it with the *standard* time carried by the conductor; if he does not carry a watch, he will be interested in knowing the exact time of day. In this way the passenger's attention will always be called to the register, and he will see whether the conductor manipulates the vertical arm of the register in recording the fare collected.

The company is not only benefited by having the conductor and passenger furnished with the correct time, by which the former is enabled to run his car on time and the passenger to see to it that he does so, but the company is also benefited by having the passenger's attention called directly to the fact as to whether the conductor rings the alarm upon the collection of his fare.

The registers are what are known as gas-meter registers of the simplest construction. The dials can be shown to the conductor or not, as may be preferred. The inventor's belief, however, is that they should be concealed from both conductor and counter, in order that the best work may be obtained from both.

Under all the systems which tell a conductor just how many fares he has recorded on a half trip, he is relieved from counting his money to see whether he has made an error or not, and it is the invariable rule that conductors do not count their money for such a purpose when provided with such registers.

The old-fashioned way of obliging the conductor to deduct the amount of his working money on each half trip from the total amount of money in his possession, and the computation of the number of fares collected, will decrease the conductor's facilities and opportunities to pilfer, should he be so inclined, correspondingly enhance the company's receipts, and will beyond peradventure secure better results from those employed to detect dishonest men.

The registers are set daily in a moment, at zero, and the dial-hands cannot pass beyond 1,000 (which, of course, is the extreme limit required for a day's use), so that there can be no tampering with the mechanism without immediate detection.

As this register is suspended from the conductor's neck, thus leaving both hands free, it requires only one hand to ring it. The advantage afforded the conductor by the use of such a register, over those that are either obliged to be carried in the hand or must be manipulated by both hands, as is the case with the "bell-punch" and its accompanying trip-slips, is apparent.

The case of this instrument is struck-up of what is known as malleable alloy nickel, so as to insure lightness. The wheels and levers are all made of hardened steel, and the instrument is made in all its parts in the best possible manner.

The register has been made with a view of meeting the wants of all street railroads, the defects of other registers having been overcome. In a word, it is as nearly perfect as ingenuity and mechanical skill can make it for the purpose of checking the collection of fares, and thus securing honest returns to the companies.

We congratulate Mr. L. H. Nutting upon his appointment as passenger agent for New York City and vicinity, for the Missouri Pacific Railway Company, and the Wabash, St. Louis and Pacific Railway Company. His headquarters are at No. 243 Broadway, where he is doing a splendid business for these great corporations, which offer excellent inducements to travelers. The general eastern agent for the same companies is Mr. H. B. McClellan, whose office is at the same address. He has charge of all passenger business in the New England States, and the States of New York, New Jersey, Maryland, Delaware, District of Columbia, the State of Pennsylvania (except the city of Pittsburgh), and Richmond, Virginia. Mr. McClellan's promotion from his duties in the freight department has been well earned.

Italy is the most malarious country in the civilized world. Of the sixty-nine provinces of the kingdom only six are nominally free from what is known as miasmatic or Roman fever, and in twenty-one the scourge assumes really serious proportions. Every year no fewer than 40,000 men in the army are attacked by the disease, and it is calculated that the prevalence of malaria necessitates the annual expenditure by the Government of something like ten million lire for the maintenance of special hospitals for public servants. It has been found that the extension of the railway system throughout the peninsula has increased the evil. The turning up of fresh damp earth, and the unavoidable formation of new banks, deep cuttings, and excavations which speedily fill with water, breed the disease in its worst forms. On one of the railway lines which runs through much marsh land, the annual rate of mortality among the employés is thirty-six per 1,000.

On the Lack of Vertical Stiffness in the Tram Rail.

To any one who has given the subject of tramway construction much thought, one point must attract immediate attention, viz.: the radical difference that governs its principles of construction as compared with those that govern steam railroad construction, which for brevity we will hereafter term merely railroad construction.

That there should exist some difference, even a considerable difference, is inevitable; but the difference that does exist is so great that a comparison of the two systems seems almost impossible in a single detail of construction. When it is remembered that the present railroad system is the outcome of a system so nearly identical with the present tramway system that it may be truly called the same, this great difference must necessarily attract attention.

The question occurs, why should the system found wanting in the one case be still faithfully adhered to in the other? Did it fill all the requirements of the latter, the question would be superfluous; but the short life of the present tramway where, comparatively speaking, light loads and slow speeds are the rule, is *prima facie* evidence that it does not fill those requirements, to say nothing of the almost universal acknowledgment that it is defective, on the part of those who have invested in the tramway.

I think a slight analysis of the difference between the two systems will teach us wherein the latter system is lacking, and I propose trying to show that it is principally due to the lack of vertical stiffness in the rail.

The subject may be considered from three points of view:

1. The foundation or sub-stratum.
2. The connection between same and the rail; and
3. The rail itself.

In the first, the tramway is not lacking. In both systems the considerations involved are very similar and differ in degree only. In both it is a question of weight or superincumbent traffic and speed of same. In the railroad, we may safely take a weight of say thirty-five tons, distributed over nine cross-ties, or say seventy-two square feet as a heavy average. In the tramway, we may take say six tons, distributed over the wheel base, as a comparison. Disregarding the support of that part of the system not directly supporting the weight, which is an assumption that puts the burden of the comparison upon the tramway, we would have six tons sustained by twenty feet. In the former case, a rough comparison of half a ton per square foot, against a third of a ton per square foot in the latter case. Apart from the consideration of weight exists the fact, that the necessities of street traffic have previously, in the case of the tramway, enforced the existence of an admirable foundation, surface drained and generally rendered compact from previous use. We cannot look to the foundation of the tramway for the deficiency.

A comparison on the second point, viz.: the connection between the rail and foundation, brings forward the main difference between the two systems. The railroad has only to provide for its own traffic, the tramway for the street traffic as well. Therefore the former system has been able to disregard all but its own purposes. The rail can be entirely exposed, and hence the connection is most simple. It consists of cross-ties laid at short intervals, to which the rails are connected by spikes, their own continuity being secured and expansion provided for by the fish-plate joint. The tramway, however, has to preserve a connection with the road-bed which will sustain a cross traffic as well as a parallel traffic, independently of its own cars. Hence, we find the cross-ties (placed further apart than in the railroad system) are reinforced by longitudinal stringers of sufficient depth to present a contact surface to the road-bed vertically, as well as horizontally. The form of rail used is very generally that of the type illustrated below.

The vertical height of a 45 lb. rail (*i. e.*, 45 pounds to the yard) is about 1¼ inches only, hence it is alone incapable of sustaining the lateral strain of cross traffic. The form of stringer used presents only a vertical and horizontal surface to the road-bed, and as the surface of the road-bed becomes quickly worn, and in many cities is much neglected, the upper part of the stringer is not adequately supported. Consequently, this cross traffic exposes this system to a torsion as well as direct strain. This is generally met by securing a greater depth than would be otherwise necessary, and further supporting the stringer by metal knees or braces. I think these defects can properly be charged only to the small depths of the rail, and consequent lack of vertical stiffness.

Dealing with the last point, viz.: the rail itself, the matter is virtually but a continuation of the preceding considerations. In the railroad system, the use of steam at an early stage of its existence rendered it necessary to support heavier weights at greater speeds. This so emphasized the need of greater stiffness in the rail that the problem was at once grappled with. In both systems the evil was common. If the orthodox would permit such a comparative use of the term, we might say that in the railroad system the evil quickly became active, whereas in the tramway system the evil has remained passive, and yet none the less costly for that.

In the tramway system, the composite rail (*i. e.*, the rail and stringer combined) does not lack in vertical stiffness, though as

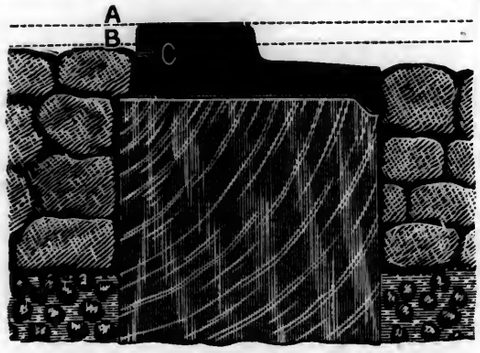


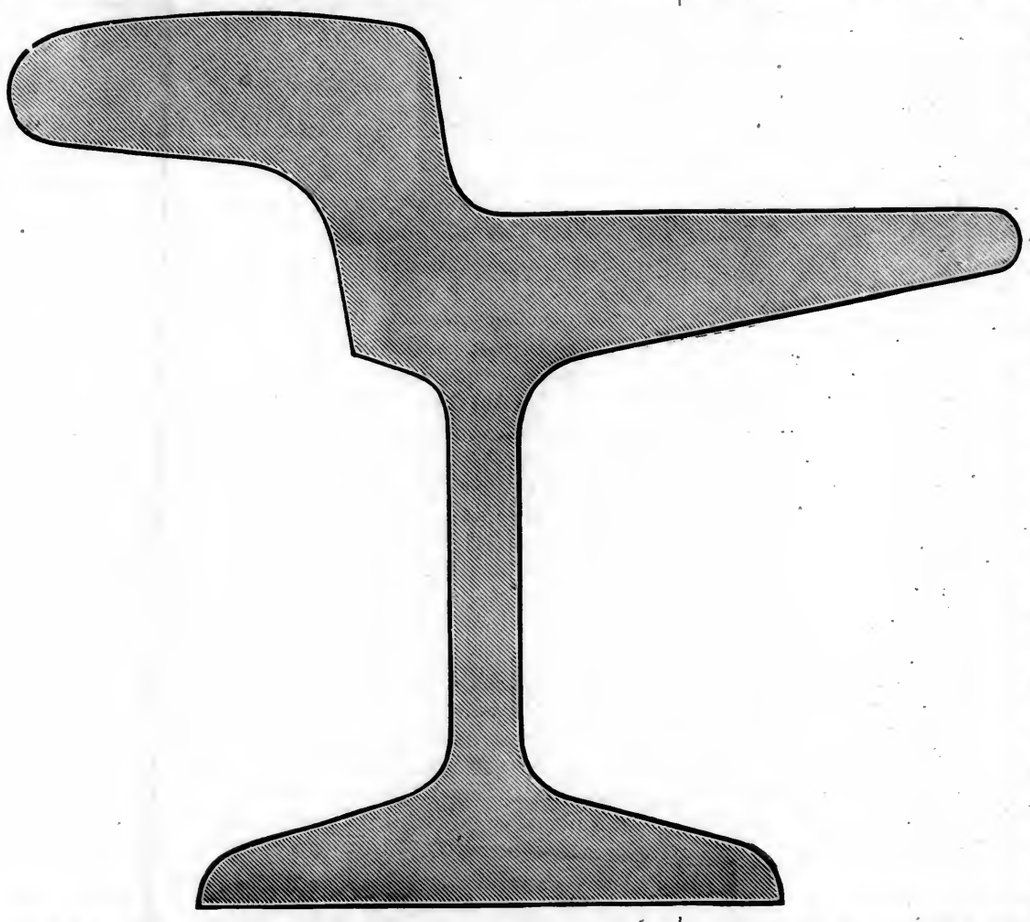
FIG. I.

already indicated the system is only composite because the rail proper does do so.

We have shown that the composite structure enforces a bulk and depth that renders the excavations excessive and the construction costly; and we can further show that its composite nature is incompatible with durability, and, indeed, forbids any approach to a smooth and perfect road. That timber as here used is not durable, is a foregone conclusion. The frequent and costly renewals of the stringers give ample evidence thereof. The nature of street traffic quickly wears the street here. The rail guides the wheels of the passing vehicles, and to a great extent holds them at this point. There is no bond between the stringer and the street, and as the wheels are running over what may be termed a dividing line, quick wear is inevitable. There is thus provided a series of receptacles for moisture during wet weather and for exposure during dry weather, that quickly rot and destroy the stringer. Another element of destruction exists in the expansion of the rail. The nature of construction is such that with a flat rail it cannot be provided for. The rail is attached to the stringer by spikes, with no room or play available. The strain of expansion and contraction is thus exerted on the timber, which yields. Again, a tram rail is exposed to the double traffic of the tram cars and street vehicles, the former using the head, the latter the flange. This pressure at different points soon loosens the rail, causes vibration and forbids stability or permanence. In fact from whatever point of view it is discussed the conclusion that a composite structure for this purpose is in-

consistent and totally wanting, seems forced upon us; and the composite system can only be replaced by a rail that has ample vertical stiffness.

In the efforts of the railroad system to secure a stiff rail, economy of material was not secured at once, as witness the old type of pear-shaped rail, followed later by the rail of massive web, still in use on many roads. To-day, however, the problem has received that amount of study which has so improved the design that there seems to be no valid reason why the tram rail cannot, at one bound, reach the desired vertical stiffness, combined with economy of material that is needed, by following the former. The rail illustrated below seems to have secured this object in a thorough manner. I append some tests thereof which are interesting, and as a guide, instructive.



TESTS FOR TRANSVERSE STRENGTH MADE AT CAMBRIA IRON CO.'S WORKS, JOHNSTOWN, PA., JUNE 7TH, 1883.

Supports 17 inches apart, Rails all of Steel.

1. Tram-rail weighing 45 lbs. per yard. Depth of head, $1\frac{1}{2}$ inches. Width of do., 2 inches. Depth of flange, $\frac{9}{16}$ inch. Width of do., 3 inches. Total width, 5 in. Elastic limit, 15,000 lbs. Ultimate strength, 32,000 lbs.

2. Test of same section of rail on a pine stringer 5 inches wide 9 inches deep.

At 20,000 lbs., timber much compressed, signs of yielding.

At 25,000 lbs., timber commenced to crack.

At 27,000 lbs., timber gave way, the two ends thereof were compressed $\frac{7}{8}$ inch, having reduced the width to $8\frac{1}{8}$ inches.

3. Test of Johnson rail here illustrated weighing 52 lbs. per yard.

Elastic limit, 80,000 lbs.

Ultimate strength not reached by machine.

At 122,000 lbs., the permanent deflection was $\frac{3}{4}$ inch in 17 inches.

4. Test of 50 lbs. Tee rail. Pennsylvania Railroad section.

Elastic limit not reached.

Ultimate strength 122,000 lbs.

As a further comparison, I append a test made some time since of a section of Tee rail, Pennsylvania Railroad standard, 67 lbs. per yard.

Elastic limit, 77,000 lbs.

Ultimate strength, 144,000 lbs.

5. A second test of the Johnson rail for elastic limit gave 75,000 lbs. On removing the strain, the permanent set was scarcely appreciable.

Criticising the rail illustrated herewith, it is seen that we have secured a section which for the same weight, is, to say the least of it, relatively as strong as the Tee rail. As the rail in its design approaches the form of a Hodgkinson beam this great strength might be looked for. The tests indicate a *greater* strength, but in the absence of carbon tests they cannot be absolutely compared. Taking the elastic limits which are the exponents of the real value of the rail, we have for the 45 lb. tram-rail a strength of 15,000 lbs., and for the 52 lb. Johnson rail a minimum strength of 75,000 lbs. That is to say, the strength of the Johnson as compared with the tram, is 5 to 1. It is further a matter of interest to note, that what I have termed a composite rail in this article, is only about $\frac{1}{5}$ of the strength of the Johnson rail. The great stiffness of the new type of rail illustrated herewith can be taken advantage of by putting the cross-ties further apart and thus reducing the cost of construction. A rail of this type when laid, is there till worn out, and must effect a lasting economy in repairs and renewal of stringers. The joint is effected as in the steam rail by the use of the fish-plate as illustrated below, and secures a true and level track.

It is worthy of note that a rail of this general type has long been in use in England. There is a difference, however, in the use of the two systems, and consequently in the proportion and general design of the rail. In England the rail is not depended upon as an aid to street traffic; on the contrary, it must be of such form and width that it does not obtrude above the road-bed or uselessly monopolize room therein. Here the rail is a valuable adjunct to the street, and an extreme width is generally enforced by municipal law. Here the width of head runs from four to five inches. There it seldom exceeds three and one-half inches (see list below of various designs, taken from the treatise of D. K. Clarke).

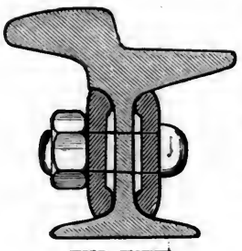
Bristol tramways, width of head $3\frac{1}{2}$ inches.

Wirral tramways, width of head 4 inches.

Barker's system, width of head 3 inches.

Liverpool tramways, width of head $3\frac{1}{4}$ inches.

It is seldom that the English rails reach a width of four inches. It is seldom that the rails in the American system are less than four inches, whereas to-day the majority reach a width of five



END VIEW.

inches. The extra width of the American rail permits of a bond with the street wanting in the English system, and moreover for the same height gives a greater vertical stiffness. It is really the case that from an engineer's standpoint, the failing, if we may so say, of the rail here illustrated, is an excess of vertical stiffness. That is to say, that a rail less stiff would answer, and the present type might be lightened. But another consideration forbids this. We have emphasized the need of a bond with the street. To secure this, the side pockets must be sufficiently capacious, and the size of these pockets is governed entirely by the height, as the other dimensions of the rail are governed by considerations that do not permit of change. Indeed, it is hard to conceive of a strain, direct, transverse or torsional, exerted upon the rail which is the subject of this article, without its being thoroughly resisted by the street itself should the rail be disposed to give. That it is not likely so to do, the tests here given indicate.



SIDE VIEW.

MANUFACTURING NOTES.

THE Philadelphia and Reading Railroad Company has recently completed ten handsome parlor cars for the Bound Brook route. They are all made with round ends. Each car has fourteen gas chandeliers and pendants, the globes of which are cut glass and imported. The platforms are covered with corrugated india rubber.

THE Philadelphia City Councils have awarded to Henry R. Worthington of New York, contracts for building two 15,000,000-gallon pumping engines for the Spring Garden Works, at a cost of $81,000, and one 7,500,000-gallon pumping engine for the Boxborough Works, at a cost of $36,000.

THE Swissvale Car Company are turning out four parlor cars for the Pennsylvania Railroad Company, the estimated cost of which will be about $60,000. They will be used on the Eastern Division of the road during the summer months.

THE Philadelphia Bridge Works, at Pottstown, Penn., has just completed a girder seventy-three feet seven inches long, and six feet high, weighing 40,020 pounds. It is intended for the Broad street crossing of the Pennsylvania Railroad in Philadelphia.

THE Philadelphia and Reading Railroad Company has placed a contract with Clarke, Reeves & Co., of Phœnixville, Penn., to build a double-track iron bridge, with a span of one hundred feet, over the canal at Phœnixville.

A PAPER steamboat has been built at Lansingburgh, N. Y., for a Pittsburgh company. Its length is twenty feet. It has seating capacity for twenty-five persons, and a carrying capacity of thirty tons. The sheathing is a solid body of paper three-eighths of an inch thick. A bullet from a revolver fired at the sheathing from a distance of only four feet, neither penetrated nor abraded it.

Railroads in Brazil.

FROM the report of United States Consul Andrews we learn that the Government of Brazil owns and administers several lines of railroad, and as a rule guarantees an income of 7 per cent on the necessary capital invested in the construction of private roads. The number of miles of railroad owned and in operation by the government is 800; and it also has nearly the same number of miles of railroad in course of construction, and which probably will be finished in six or eight months. The number of miles of private railroads in operation is 1,600, and in course of construction 1,400. On the capital of $34,000,000 employed by the private companies owning these roads, the government has guaranteed an annual income of 7 per cent. This guarantee is not a loan, but an absolute gift, and so far the government continues to pay the interest on the above mentioned capital. As soon as the companies begin to make sufficient earnings, the government will cease the payment of interest. Fully one-third of the railroads are through a hilly country. The greater portion of them are through a country that has long been settled, though a considerable part is yet but sparsely settled. Most of the rails with which the roads have been made were imported from England, while a part of the rolling-stock was brought from the United States. The roads are surveyed and built by Brazilian engineers almost wholly.

LITERARY NOTES.

THE last catalogue of Frogs, Switches, etc., manufactured at the Jersey City Iron Works, Jersey City, N. J., is an admirably arranged oblong manual, strongly bound in cloth, and containing, besides the illustrated pages giving information of the articles named, much matter useful to business men generally, and a liberal supply of ruled pages for memoranda. This is a neat, convenient and valuable little book.

OUR acknowledgments are hereby made to the Passenger Department of the Detroit, Lansing and Northern Railroad, for a copy of the pamphlet entitled, "Detroit and the Pleasure Resorts of Northern Michigan." This consists of nearly ninety octavo pages of illustrated descriptive matter judiciously arranged with business announcements, bound in a handsome wrapper, and constituting a work which the recipient must value for its pleasant qualities as well as for the information contained within its pages. The pamphlet records very remarkable progress in a great State, is an evidence of commendable enterprise in the corporation which publishes it and is full of reason, pictorial and other, why people should seek and certainly find summer sport and recreation among the much-varied and delightful resorts of Michigan.

IN Berlin, street cars do not, as in American cities, stop anywhere at the beck or whistle of persons desiring to take passage, but only at certain places along the line. The cars are comfortably furnished, but the driver is almost constantly ringing a big alarm bell, which is very annoying. Women skip on and off the cars in motion with all the grace and agility of a newsboy. They also share with the men the prerogative of riding on the platforms.

NEW INVENTIONS.

TO INVENTORS AND PATENTEES.

THIS department is devoted to the notice, consideration and description of new and valuable inventions applicable to Railroads, Steam Navigation, Machinery, Manufactures, Mining and Tramways. New patents of this description appearing in the weekly Official Gazette of the Patent Office are duly noticed in our columns, and full descriptions of those most useful and important are published *free of charge*.

☞ Inventors, Patentees, and the holders of Patents are requested to forward us their claims and specifications, with description of their inventions for our examination with a view to their publication in this department. Descriptive cuts, diagrams, and illustrations of the same are also desired.

☞ In selecting inventions for full description in this department, the editor will be guided solely by their importance and value, and their interest to the readers of the AMERICAN RAILROAD JOURNAL.

List of Patents for Inventions Relating to Railways, Tramways, Machinery, Etc.

BEARING DATE OF MAY 15, 1883.

277,460. Grain-Car Unloader: John H. Chase, Rochester, N. Y. Filed Oct. 25, 1882.

277,464. Lubricator: Warren H. Craig, Lawrence, Mass. Filed March 12, 1883.

277,466. Car-Coupling: Levi Davis, Jr., Alton, Ill. Filed Dec. 26, 1882.

277,476. Car-Brake: Philip R. Frey, Western Union, Wis. Filed Oct. 25, 1882.

277,490. Wheel-Guard for Railway-Cars: Joseph Jacobs, San Francisco, Cal. Filed Feb. 24, 1883.

277,536. Electric Head-Light for Locomotives, etc.: Flamen Ball, Jr., Cincinnati, Ohio. Filed Aug. 2, 1882.

277,539. Switch-Stand for Railways: Edward J. Beard and Howard V. Hinckley, Topeka, Kans. Filed Jan. 31, 1883.

277,546. Safety Car-Heater and Ventilator: William F. Condon, East Saginaw, Mich. Filed April 9, 1883.

277,552. Railway-Switch: Thomas J. Daly, San Francisco, Cal. Filed June 26, 1882.

277,569. Railway Telegraphic Signal: Rudolph M. Hunter, Philadelphia, Pa. Filed Oct. 16, 1882.

277,587. Car-Brake: Joseph Lytle, Cincinnati, Ohio. Filed April 19, 1882.

277,597. Spike for Railroad-Rails: William J. Morden, Chicago, Ill. Filed Aug. 25, 1882.

277,626. Car-Heater: Robt. Steel, Philadelphia, Pa., assignor of one-half to Charles Mace, same place. Filed Dec. 21, 1882.

277,635. Car-Coupling: William R. Wallace, Mount Vernon, Ill., assignor of two-thirds to Thomas L. Rivers, same place. Filed Nov. 3, 1882.

277,647. Brake-Shoe: William White, McMinnville, Tenn. Filed Feb. 16, 1883.

277,674. Car-Coupling: Edward R. Brown, Spartanburg, S. C. Filed Sept. 16, 1882.

277,677. Car-Coupling: Thomas F. Byron, Lowell, Mass. Filed Dec. 16, 1882.

277,684. Split Switch: John H. Crowley and Bernard M. Temple, Galveston, Tex. Filed April 17, 1883.

277,697. Railroad-Switch: Jacob Elmer, Biloxi, Miss. Filed Nov. 8, 1882.

277,698. Car-Coupling: Wheeler Willard Fitch, Honeoye Falls, N. Y. Filed Feb. 26, 1883.

277,701. Car-Coupling: Joseph C. Fowler, Galveston, assignor of one-half to Sinclaire Taliaferro, Houston, Tex. Filed March 20, 1883.

277,723. Car-Coupling: John Heffner, Hopewell Township, and William Kelly, Liberty Township, Bedford County, Pa. Filed March 24, 1883.

277,735. Nut-Lock: William M. Irvine and John J. Waddill, Montgomery, Ala. Filed April 7, 1883.

277,745. Station-Indicator: Henry Koehler, Pomeroy, Ohio. Filed Nov. 27, 1882.

277,765. Tubular Railway-Rail: Almeron McKenney, Chicago, Ill. Filed Sept. 25, 1882.

277,766. Railway-Rail: Almeron McKenney, Chicago, Ill. Filed March 11. 1881. Renewed Oct. 9, 1882.

277,773. Car-Coupling: Thomas B. Nutting, Morristown, N. J. Filed Feb, 14, 1883.

277,783. Suspension Railroad-Car: Daniel Query, Atkinsonville, Ind. Filed Jan. 17, 1883.

277,819. Railway-Car: Thomas L. Wilson, Port Hope, Ontario, assignor of one-half to Samuel Davis, Montreal, Quebec, Canada. Filed Feb. 15, 1883.

277,823. Car-Coupling: Noah R. Zimmerman, Elizabeth City, N. C. Filed March 8, 1883.

277,825. Car-Axle: Henry C. Atkinson, Franklin, Ky., assignor of a part to T. B. McKenzie & Harris, Jodie Black, John G. Harris, R. B. Phillips, G. S. Black, L. J. Jones, and I. H. & T. M. Goodknight. Filed Jan. 30, 1883.

277,828. Car-Coupling: Nicholas Barr, Cayuta, N. Y. Filed Feb. 21, 1883.

277,837. Car-Coupling: Alfred Fulton, Chicago, Ill., assignor of one-third to Peter Peterson, same place. Filed Aug. 4, 1882.

277,854. Safety-Casing for Railway-Car Stoves. Benjamin D. Stevens, Burlington, Vt. Filed Dec. 18, 1882.

BEARING DATE MAY 22, 1883.

277,897. Steam-Engine: Henry Hartig, Brooklyn, N. Y. Filed Oct. 7, 1882.

277,903. Car-Ventilator: Owen H. Jones, Hartford, Conn. Filed May 11, 1882.

277,915. Car-Coupling: William J. McLean, Jackson, La. Filed March 29, 1883.

277,918. Car-Coupling: Susan P. Moulton, Salem, Mass. Filed March 7, 1883.

277,921. Spike: James T. Nulty, Philadelphia, Pa. Filed July 20, 1882.

277,983. Governor Cut-Off-Valve Gear: Isaac W. Bragg, Kidder, Mo. Filed Aug. 11, 1882.

277,990. Electric Train-Arrester: Harry W. Carlton, Peoria, Ill. Filed Dec. 6, 1882.

277,994. Locomotive: William E. Cole, Montgomery, Ala. Filed March 15, 1883.

278,007. Buffer: Robert P. Garsed, Norristown, Pa. Filed March 18, 1882.

278,014. Car-Coupling: Louis Herrman and John B. Lavin, Boston, Mass., assignors to themselves and Louis Joseph Herrman. Filed March 29, 1883.

278,016. Railway-Track Joint: Julius H. Holmgreen, Muskegon, Mich., assignor to himself and Robert Bloss, same place. Filed Oct. 18, 1882.

278,020. Balanced Slide-Valve: Samuel E. Jarvis, Lansing, Mich. Filed Dec. 13, 1882.

278,032. Nut-Lock: Michaelangelo W. Meagher, New York, N. Y., and James C. Anderson, Winnipeg, Manitoba, Canada. Filed April 13, 1883.

278,048. Car-Axle and Box: Levi H. Roberts, Paris, Ill. Filed March 21, 1883.

278,058. Balanced Valve: Edward Stewart, Battle Creek, assignor of one-half to Richard W. Lonsbery, Richland, Mich. Filed Jan. 26, 1883.

278,062. Steam-Engine: Eduard Tandler, Grand Rapids, Mich. Filed Feb. 26, 1883.

278,092. Freight-Car-Door Fastening: William J. Carey, Millvale, assignor of one-half to Henry P. Staving, Allegheny, Pa. Filed March 19, 1883.

278,112. Feed-Water Regulator: David Edwards, New York, N. Y. Filed April 12, 1883.

278,133. Duplex Direct-Acting Engine: William H. Guild, Brooklyn, N. Y., assignor to Guild & Garrison, same place. Filed March 29, 1883.

278,141. Device for Lighting the Steps of Cars, etc.: Geo. W. Hunt, Philadelphia, Pa. Filed Jan. 2, 1883.

278,164. Steam-Pressure Gage: Murdock McNeil, East Cambridge, assignor of one-fourth to Richard S. Smith, Boston, Mass. Filed Oct. 25, 1882.

278,196. Feed-Water Heater: Edwin R. Stilwell, Dayton, Ohio. Filed Feb. 24, 1883.

278,213. Signal-Light for Railway-Cars: Albert A. Bissell, Joliet, Ill., assignor of one-half to Edward R. Knowlton, same place. Filed Feb. 14, 1883.

278,223. Water-Gage: Willard A. Clark, Stillwater, Minn. assignor to the Northwestern Manufacturing and Car Company, same place. Filed March 13, 1883.

278,231. Railroad-Signal: David Frank, Allentown, Pa. Filed June 3, 1882.

278,235. Car-Coupling: William J. Gossett, Liberty, Tenn., assignor of one-half to J. J. Williams and S. D. Bass. Filed May 3, 1882. Renewed March 14, 1883.

278,236. Automatic Car-Stove-Fire Extinguisher: James F. Gyles, Chicago, Ill. Filed March 3, 1883.

278,242. Locomotive-Brake: Edward B. Leigh, St. Louis, Mo., assignor to the American Brake Company, same place. Filed March 6, 1883.

278,285. Refrigerator-Car: Daniel E. Somes, Washington, D. C. Filed Jan. 24, 1883.

278,292. Car-Truck: Ira C. Terry, St. Louis, Mo., assignor of one-half to Andrew Warren, same place. Filed March 16, 1883.

278,297. Railway Steam Car-Brake: Fred. B. Walker and James Lauder, Galveston, Tex. Filed Jan. 12, 1883.

278,299. Steam-Brake for Locomotives: William B. Wallace, Belleville, Ill. Filed Nov. 16, 1882.

BEARING DATE MAY 29, 1883.

278,309. Journal-Box Lubricator: Nels M. Bergqvest, Chicago, Ill. Filed Oct. 30, 1882.

278,328. Car-Buffer: Adolphe Gallinant, Roslyn, N. Y. Filed Feb. 28, 1883.

278,334. Car-Coupling: Hale E. Hawk, Kansas City, Mo. Filed Feb. 23, 1883.

278,343. Dumping-Car: Sidney D. King, Pittston, Pa. Filed March 27, 1883.

278,344. Railroad-Switch: James Leet and Alexander C. Israel, Kimmswick, Mo. Filed Nov. 8, 1882.

278,349. Harness-Saddle: Stephen A. Marker, Newark, N. J. Filed May 31, 1882.

278,377. Catch for Grain-Car Doors: Dennis F. Van Liew, Aurora, Ill. Filed Dec. 21, 1882.

278,378. Car-Starter: Chas. P. Warnick, Chicago, Ill., assignor of one-half to Charles Jahnke, same place. Filed Feb. 24, 1883.

278,382. Steam Snow-Shovel: William A. Woods, Woodford's Corner, Me., assignor to himself and Louise A. Williams, Boston, Mass. Filed Oct. 26, 1882.

278,387. Ball-Governor for Steam-Engines: William E. Badger, Quincy, Mass. Filed March 29, 1883.
278,397. Air-Engine: Harvey H. Burritt, Newark, N. J. Filed March 21, 1883.
278,403. Car-Coupling: Newell P. Cowell, Cleveland, Ohio, assignor to the Cowell Platform and Coupling Company, same place. Filed Jan. 28, 1882.
278,404. Shaft-Hanger: Hilen C. Crowell, Erie, Pa. Filed Sept. 18, 1882.
278,428. Railroad-Spike: William Goldie, West Bay City, Mich. Filed Aug. 2, 1882.
278,429. Locomotive or Car-Brake: William B. Guernsey, Norwich, and William B. Turner, New York, N. Y., assignors of one-third to the Torrey Automatic Brake Company, of New York. Filed June 2, 1882.
278,440. Device for Blowing Locomotive-Whistles Automatically: Edwin A. Leland, Holyoke, Mass., assignor of three-fourths to Chas. P. Lyman and Hervey K. Hawes, both of same place. Filed July 3, 1882.
278,446. Hot-Air Engine: Thomas McDonough, Montclair, N. J. Filed Oct. 19, 1882.
278,451. Valve-Gear for Steam-Engines: Eugene O'Neill, San Francisco, Cal. Filed Feb. 27, 1883.
278,470. Locomotive: Edward A. Trapp, New York, N. Y. Filed Feb. 16, 1883.
278,478. Device for Dressing Valve-Seats of Globe-Valves: Pliny J. Wright and Samuel Rust, South Hadley Falls, Mass. Filed Feb. 24, 1883.
278,488. Hygrometric Governor for Railway-Heads: George A. Ayers, Holyoke, Mass. Filed Sept. 4, 1882.
278,489. Station-Indicator: Charles O. Ball, Lowell, Mass. Filed Dec. 2, 1882.
278,495. Car-Truck: Austin A. Brooks, Eau Claire, Wis., assignor of one-half to John A. Whitfield and Henry M. Wilcox, same place. Filed March 13, 1883.
278,496. Means for Utilizing the Waste Heat of Furnaces: William H. Brooks, New York, N. Y. Filed Feb. 21, 1883.
278,517. Rock-Drilling Apparatus: George McC. Derby, New York, N. Y. Filed Nov. 14, 1882.
278,533. Railway-Switch: John Gibbon, U. S. Army. Filed Dec. 15, 1882.
278,548. Railway-Switch: John L. Hill, Brooklyn, N. Y. Filed Sept. 6, 1882.
278,573. Car-Coupling: Charlie E. Mark, Flint, Mich. Filed Jan. 15, 1883.
278,598. Car-Coupling: Jacob Rhule, Pittsburgh, Pa., assignor of one-half to John Herman Jantzen, same place. Filed Jan. 24, 1883.
278,602. Reflector and Signal Frame for Car-Lamps: Henry Roth, New York, N. Y., assignor to Annie Roth, same place. Filed Jan. 31, 1883.
278,605. Car-Coupling: Charles H. Schaaff, Alexandria, Va. Filed Feb. 24, 1883.
278,606. Car-Buffer: John T. Schaffer, Rochester, N. Y. Filed March 30, 1883.
278,611. Car-Door and Fastening: Wm. P. Senour, Pimento, Ind. Filed March 14, 1883.
278,616. Car-Brake: Charles W. Smith, Coalesburg, Mo. Filed March 6, 1883.
278,626. Car-Coupling Link: Frank Sweetland, Edwardsburg, Mich. Filed March 13, 1883.
278,628. Spike: William Taylor, Pittsburgh, Pa., assignor to the Angular Steel Nail Company, (Limited,) same place. Filed Jan. 19, 1883.
278,637. Steam-Boiler Furnace: Ezra W. Vanduzen, Newport, Ky. Filed Dec. 14, 1882.
278,648. Balanced Rotary Valve: Abiel E. Wilson, Worcester, Mass. Filed Feb. 28, 1883.

Chapman's Boiler Cleaner.

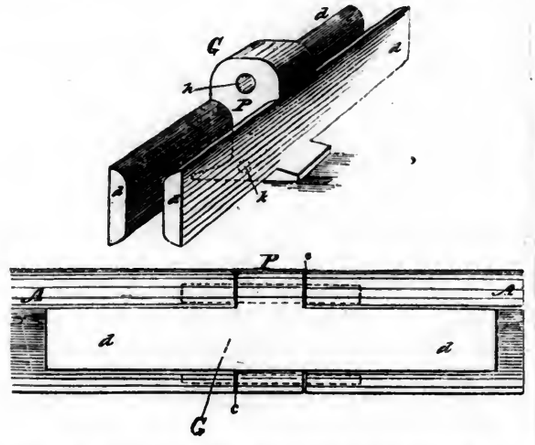
THE principle of operation in the Boiler Cleaner invented by Mr. G. A. CHAPMAN, of Strawberry Point, Clayton County, Ia., is to connect the top of the water with the bottom of the water in the boiler and wall, if there is any wall, through a mud-settling drum back to the bottom of the boiler, and, in cases when practicable, the surface pipe may extend inward and take on a funnel mouth. The mud drum must have a blow-off valve at the bottom, and for convenience a globe valve above and below the mud drum is desirable, so that the mud drum can be cleaned without emptying the boiler. The mode of operation is as follows: When the water begins to boil, currents are established upward and in the direction of the cooler parts of the boiler, and finding an outlet at or near the surface of the water, the water is forced out through the surface pipe into the mud drum, where the water is comparatively still, not being disturbed by boiling heat; and as the rising currents in the boiler draw upward, the water in the mud drum is drawn back into the boiler with considerable force. Hence a strong current is established through the pipe and mud drum, and as the sediment is carried into the drum by the current, it separates from the water by settling in the drum, where the water is still; and as all the water in the boiler in time must pass through the drum, the sediment is left therein, when it may be blown off at leisure. Thus the boiler is kept free of sediment, and if any "scale" has been already formed, it will get weak and cleave off in a short time after the boiler has been put on, and be raked easily out of the hand-hole. When, the inventor claims, the boiler is once thus cleaned, there is no need of blowing off any more, for everything is kept clean without the necessity of doing this. Hence the durability of the boiler is increased, the bill for fuel reduced and the trouble and expense of cleaning the boiler saved.

The Trenear Coupling.

THE Car-Coupling invented by JOHN G. TRENEAR, of Huntington, W. Va., has two keys through the draw-head, one keeping the socket in place, and the other to keep the bolt rest from coming out too far. Provision is made to take the friction from the rest when moved by the spring, by the presence of a small wheel. The lip of the rest does not touch the bolt, which allows the spring to press the link against the bolt, and the curve in the rest keeps it in place while it enters the other draw-head and presses back the rest, and the bolt drops in place. The brakeman can stand on the top of the car and uncouple. The bolt cannot come out of place. When it is high enough, one of the keys before mentioned stops it and the rest is pressed out by the spring to hold it up, till in coupling it is pressed back again with the link, and the bolt falls into place.

Rail-Joint Fastener.

GEORGE F. HOEFFER, counsellor-at-law, San Francisco, formerly of Chicago, is the patentee of a rail-joint fastener which is claimed to make a continuous rail, thus obviating the necessity of repairs, seeing that the ends of the rails can never be "hammered out" by the trains, and that thoroughfare, rails and fastener will wear out together and at the same time. More specifically, the object of Mr. Hoeffer's invention is to obtain such a construction and combination of the locker rods and rails that a junction may be accurately, quickly and durably effected without the aid of nuts, bolts, or screws. His device consists in the combination, with a four-armed perforated locker, of two face-bored rails, holding in said bores the ends of rods passing through the perforations of said locker. Its advantages, particularly stated, are, first, that the fastener secures an accurate, close and durable connection of the rails; second, that it does not interfere with either the contraction or the expansion of the rails; and, third, that the same is quickly attached, saving time, labor, and expense.



In the drawings, Figure 1 indicates vertical front or face end elevations of two rails, A A, each of which has two bores, *b b*, of sufficient diameter and depth to admit freely the ends of the respective rods shown in Fig. 2. Fig. 2 indicates two ordinary

rods, *c c*, made of wrought-iron, steel, or other suitable metal. Fig. 3 indicates the locker G, made of wrought-iron, steel, or other suitable metal, having four arms, *d d d d*, of desired length, and of shape and width so as to fit snugly into the recesses *n n* (see Fig. 1) of the rails. The locker with its four arms may be made in one piece, or, in anticipation of repairs to rails, the arms, *d d*, may be attached to *P*, the body of the locker, by means of a bolt or nut. But, as was intimated before, there is no need of this. The body P of the locker is in height equal to the height of the rail, and its extreme upper and lower parts conform in shape and size respectively, to those of the rails. Said body P has also two perforations, *h* and *k*, for the reception and passage of the rods *c c*, and are, when the rails are slipped into the arms of the locker, on a horizontal line with the bores *b b* in the face end of the rails. Fig. 4 indicates two rails joined by devices embodying my invention.

The fastener is constructed and the juncture of the rails is effected as follows: Having passed the rods *c c* into their respective perforations *h* and *k* of the locker, so that the ends of said rods project equidistant from both sides thereof, slip the rails into the arms *d d d d* of the locker up to the body P, passing the projecting ends of said rods into the bores *b b* of the rails. Then spike the locker and the rails to the ties.

If the rails are light weight, the dowel-pin may be dispensed with, and if of extraordinary weight or size, then the locker may be dispensed with and only the dowel-pins used. In ordinary rails the two are to be used in combination.

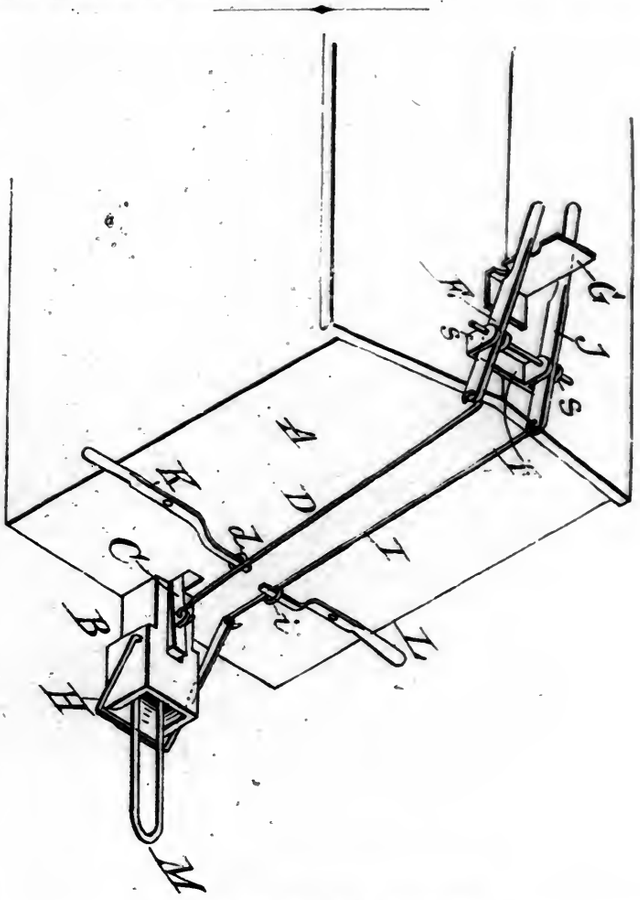
Car-Coupling.

A NEW coupling, noticeable among the many being worried out by laborious brains, is that of CHARLES M. EZELL, of Baskinton, La. This invention relates to improvements in that class of automatic car-couplings in which a bail or link is pivoted to each draw-head or bumper, and which is adapted to be operated from either side of the ends of the car in such manner that the bail or link upon one draw-head may be brought down over a post or hook upon the opposite draw-head or bumper to connect two or more cars together; and the improvements consist essentially of a bail or link rigidly attached to and standing at right angles with a metallic bar or rod pivoted to the ends of a car, and provided with handles or levers at each side of the ends of the car, whereby the said bail or link may be readily brought down over a post or stud of peculiar construction upon each opposite draw-head or bumper.

The inventor claims that his is a most simple and effective coupling, one not liable to get out of order, which will readily allow of the car passing the most abrupt curves without liability of strain or injury to its several parts, and which also obviates the necessity of passing between cars to couple them.

Houghtaling's Car-Coupling.

LLEWELLYN A. HOUGHTALING'S (Elmira, N. Y.) newly patented Car-Coupling is a very simple and cheap contrivance, and is commended by competent railroad men. It can be put on any draw-head now in use, requiring no outlay for new draw-heads. It works equally well on cars of different heights as on those of the same height. The device consists of a stirrup or bail hung to the draw-head in such a manner as to swing up over the under side of the draw-head, and thus lift the link any desired height. A prong or slide is projected from the under side of the stirrup for the approaching draw-head to strike against after the link has entered, and thus slide it down out of the way of being jammed by the approaching draw-head. A rod, with an arm in the center and one at each end, is placed under the end of the car, to be operated from either side by the short arm being thrown backwards or forwards. From the arm in the center of the rod, or under the center of the car, is a connecting rod which connects by a peculiar open joint with the bail or stirrup hung to the draw-head. So, it can be very easily seen, by working the arm or lever at the side of the car, that the link is raised or lowered, and no danger of the brakemen being killed or crippled for life. In case the draw-head pulls out, as it often does, in such a case the stirrup or rod would be broken if it were not for the peculiar open joint already mentioned, which slips apart as soon as the draw-head pulls out, and can be slipped together again as the draw-head is put in.



The Hawkins Car-Coupling.

THIS is the invention of WILLIAM A. HAWKINS and CHARLES S. HAWKINS, of Waxahachie, Tex. It is patented.

In the accompanying drawings, illustrating the invention, Figure 1 is a perspective view of a portion of a car with our devices attached to one end thereof; and Fig. 2 is a side elevation of the couplings, partly in section. Like letters indicate like parts. The letter A represents a car-body, to the lower side of one end of which a bumper, B, is attached in the usual manner. This bumper B is recessed, as shown in Fig. 2, and in this recess the coupling-hook C is pivoted. An ear, *c*, is formed on the upper side of the coupling-hook C, near its front end, through which the lower end of a connecting-rod, D, is passed. The upper end of the connecting-rod D is attached to the forward end of a lever, E. This lever E is pivoted to a plate, F, provided with lugs or bearings *f*, which is suitably secured to the top of the car. The rear end or handle of the lever E is capable of being placed in notches formed in a locking-plate, G, attached to the top of the car A, as shown. The lower forward end of the bumper B is provided with a lip, *b*, upon which the forward end of a pivoted stirrup, H, rests when not in use. One side of the stirrup H is prolonged backward, and through its end the lower end of a connecting-rod, I, is passed. The upper end of this rod I is attached to the forward end of a lever, J, which is

pivoted upon the top of the car in the same manner as the lever E. The side of the locking-plate G adjacent to the pivoted lever J may also be provided with notches for the reception of the handle of said lever. The connecting-rods D I are respectively provided with a projection, *d i*, through which the inner ends of levers K L are passed. These levers K L are pivoted to the end of the car at each side and at such distance above the bumper B as to be within easy reach of the operator when standing upon the ground. The longitudinal movement of the coupling-link M, which may be of any suitable construction, is limited in the bumper B by a partition, *e*, formed in said bumper. This partition *e* is preferably concaved or rounded to correspond with the end of the coupling-link. The link M may be guided into its proper position in the bumper of an approaching car by raising or lowering the stirrup H, which is accomplished by a proper manipulation of either of the levers J L. When the locking-plate G is provided with notches in its side adjacent to the lever J, the stirrup H, and consequently the link M, may be kept in any desired position by forcing the handle of said lever into the desired notch. It will be seen that by this arrangement cars of unequal height may be as readily coupled as those that are equal in height. The uncoupling of the cars may be effected by operating either of the levers E K so as to raise the hook C from its engagement with the link M. By forcing the handle of the lever E into one of the notches in the locking-plate G the hook C may be firmly secured in either a raised or lowered position. By the construction and arrangement of these devices it will be observed that the coupling and uncoupling of the cars and the guiding of the link to its proper position may be effected from either the top or side of the car with equal facility and without any accompaniment of danger to the operator. Instead of the hook C, a coupling-pin or bolt of any desired construction may be used. The device is especially adapted to freight and other like cars; but it may be attached to any description of car with but little alteration.

Successful and Interesting Trial Trip of a New Cattle Car.

THE humane transportation of cattle has for many years been a matter engaging the attention, not alone of dealers, shippers and the various anti-cruelty societies, but the general public as well, for the consumer is certainly a vitally interested party. It has long been conceded that the general methods in vogue of bringing cattle to market are of a primitive nature, and so inhuman and brutal that it is not surprising that the law has often been directed to the evil, and protective measures sought to remedy it. From Chicago to the various markets of the United States vast numbers of live cattle are shipped yearly. These animals, huddled together in ordinary stock cars of insufficient dimensions, suffer untold tortures during their journey by rail, and the result is plainly apparent at the conclusion of the trip, when, if current official reports may be quoted, the average shrinkage in weight of each animal is found to vary from 10 to 15 per cent. That is to say, an animal will get into a car at Chicago weighing 1,400 pounds, take a five days' ride to Watertown, and upon arrival at the latter place tip the scales at from 1,190 to 1,260 pounds. This matter of shrinkage is the cattle shippers' greatest bane; it means not only lighter but unhealthy cattle. Indeed, upon this point, Dr. F. H. Hamilton, of New York, has written that "there can be no doubt that the

MENTAL AND PHYSICAL SUFFERING

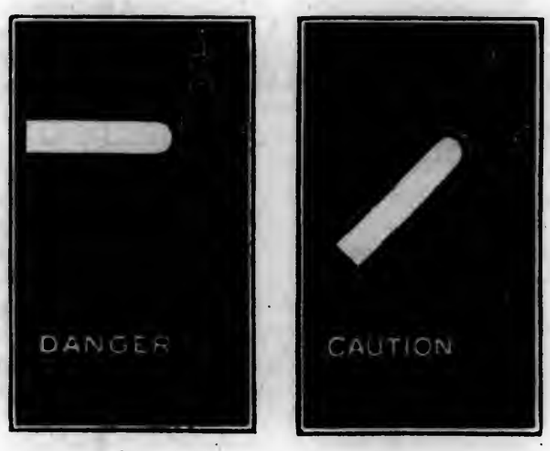
necessarily incident to these conditions render the meat of such animals decidedly unwholesome." To obviate this evil, much labor has been expended and many experiments have been made during the past years. The Society for the Prevention of Cruelty to Animals has constantly stimulated inventors to work in this field, and it is fair to say that its efforts have been recognized as tending toward the best interests of both shipper and consumer. One of the latest inventions in the line of stock cars arrived from Chicago at the Watertown stock yards recently, where it was exhibited by the patentee and inventor, Mr. George D. Burton, of Boston. Quite a large party of cattle men and newspaper men were present, and Mr. Nathan Appleton of the anti-cruelty society was among the party who drove out to the stock yards. Mr. Burton's car is probably 50 feet long, 14 feet shorter than an ordinary passenger car, and about as many longer than the common cattle car. It is divided into three compartments, and in each compartment six cattle are placed, the animals standing lengthwise in the car, three being placed in each of the two stalls into which the compartments are sub-divided. Thus each car carries 18 cattle, and there is ample room for the animals to lie down, a point in which the ordinary box car appears to be sadly deficient. Perhaps the most noteworthy and ingenious feature of the car is found in its feeding arrangements. Nowadays it is customary in shipping cattle to feed and water them at convenient stations, no fodder being taken on the journey. It is probable the poor creatures would fare very poorly but for the legislative enactments in various States, which compel shippers to make stops of several hours' duration, during which the cattle must be unloaded and fed. The car on exhibition, however, is fitted with 18 feeding bins, opening into convenient troughs and operated by a lever from the top of the car, the heads of the animals having been previously secured through stanchions, also operated from the top of the car. Each feeding bin has a capacity of two bushels, and the lever is ingeniously operated to measure, through feed spouts, exactly two quarts at a stroke. Hay is also carried in a separate part of the car, and is fed into the troughs through side-traps. A water-pipe running along



THE BURTON STOCK CAR.

THE CENTER OF THE CAR

has outlets at each stall, and each water-trough is provided with a waste pipe, to obviate the overflow. Water is obtained from the roadside water crane common to all railroads. This, briefly, completes the mechanism of the car. The item of time saved in feeding the cattle in transit is alone claimed to be a vastly important one. All the improvements shown are of a decidedly humane nature, and the car was inspected with the liveliest interest by the fifty or more gentlemen at the stock yards. The car, it appeared, was loaded at the Union yards, Chicago, eighteen cattle, with a net weight of 24,200 pounds (or an average of 1,344½ pounds), entering the car and being secured, the operation of loading occupying less than twelve minutes. The trip was made over the Grand Trunk line, and the cattle were not unloaded until their arrival at Watertown, Mass., this period of transit including a "side trip" to Keene, N. H., under Mr. Burton's direction. Agent Chaffee, who accompanied the car, was enthusiastic in his praise, and claimed that the feeding arrangements were simply perfect, working throughout without a hitch of any description. The animals frequently laid down during the trip, and, at Lansing, Mich., the entire eighteen head were placidly reposing. Arriving at Watertown, the unloading began. In spite of the adverse prediction of several cattle drivers, not the slightest difficulty was experienced in this regard. A movement of the lever connected with the stanchions unloosened each animal, and they trotted out of the car and into the stock yards in less than five minutes, looking remarkably bright and moving with spirit. The question of shrinkage was next brought up, and, in accordance with cattle customs, the eighteen head were weighed, when it was found that the net weight was 23,850 pounds, or an average of 1,325 pounds. The average shrinkage after a six-days' journey thus appeared to be only 1.3 per cent. The trip was certainly a successful one, productive of some significant results, and, if the predictions of the cattle men amount to anything, the old box cars will soon have seen their last day.

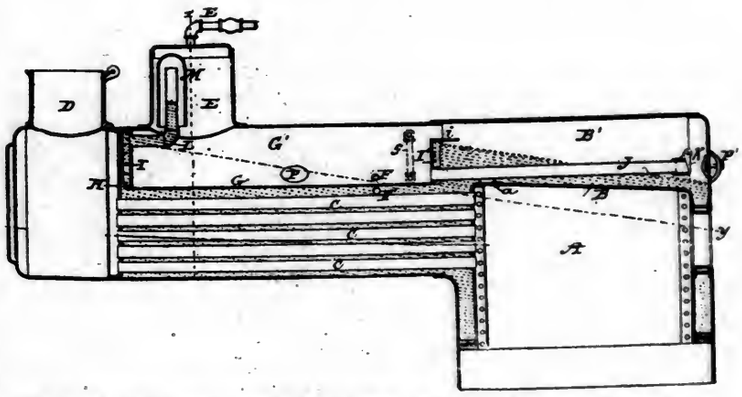


Some of the worst railway accidents which have occurred after dark have been traced to the inability of the engine-driver to distinguish a red from a white light—an optical defect known as "Daltonism." An accident from this cause ought, in future, to be an impossibility, for Mr. Andrew W. Tuer ("Bartolozzi" Tuer) and Mr. James Cleminson, a well-known railway engineer, have conjointly invented a new system of railway signalling, consisting mainly in continuing at night the use of the ordinary day semaphore signal, the arms or pointers being boxed and illuminated internally, so as to form a broad and continuous band of white light, the position, as by day, determining whether the road is clear or blocked. The new signal can naturally be seen from a much greater distance than a single red or white light, and it is obvious that its meaning could only willfully be misinterpreted.—*London World.*

Improved Steam Boiler.

PATENTED JANUARY 30, 1883.

MANUFACTURED BY THE GEISER MANUFACTURING COMPANY, WAYNESBOROUGH, PA.



This valuable improvement in steam boilers is the invention of F. F. Landis, of Waynesborough, Pa., and relates more particularly to improvements in steam boilers for traction-engines, or boilers subjected to motion and changes in their level; and the objects of these improvements are to produce a boiler that can be easily taken care of by inexperienced persons, and at the same time possessing several requisites—viz.: lightness and great strength, containing water covering the crown-sheet to a good depth, whatever may be the level of the boiler in descending hills. The claim includes, in a steam boiler constructed with flues, a compartment having a floor located above said flues only, and having a rear partition or head adapted to retain a body of water upon the crown-sheet when descending a grade; in a steam boiler, a front and a rear compartment separated by a chamber under the steam-dome, said compartments communicating with each other and with the steam-dome, substantially as shown in above drawing, a front and a rear compartment separated from each other by a flanged head provided with a supply-pipe, having a valve; in a steam-boiler constructed with flues, a chamber located above the flues, provided with a feed-water pipe and its front partition provided with a steam-pipe, leading to the dome, and a rear partition provided with a water-circulating pipe; in a portable or traction-engine steam boiler, the combination of a fire-box, a chamber above the same, having a water-communication with the flue-compartment and a steam-communication with a second chamber located above the flue-compartment, a steam-pipe leading from the latter, and a deflecting-bell; by this valuable patented device the *greatest* difficulty experienced in the successful operating of *road engines* has been overcome, as it has been thoroughly tested on steep grades and found to hold the water on *crown*-sheet of the boiler, and rendering it perfectly safe to the operator of the engine. As a step in advance of any we have heard of it is destined to be of great importance to persons using this class of engines, and will no doubt be the means of a large increase of trade for the company who manufacture this style boiler. For further information the reader is referred to the Geiser Manufacturing Company, Waynesborough, Pa., who also manufacture engines, boilers, saw-mills, road locomotives, grain hoisters, horse-powers, etc.

The railway viaduct at Garabit, in France, now being erected over a river in the department of Cantal, has a total length of about 1,880 feet, and near the middle of the great center arch, which is one of the noteworthy features of the structure, the height from the bed of the river to the rail is 413 feet. The viaduct was commenced in 1881, and is to be completed next year. The cost is estimated at about $600,000.

New Reversing Gear for Steam Engines.

THE machinery described in this article and illustrated by the accompanying engravings, is the invention of FREDERICK ROCK, of Homer, New York, who is the assignor of one-half to William Hitchcock, of the same place.

Fig. 1

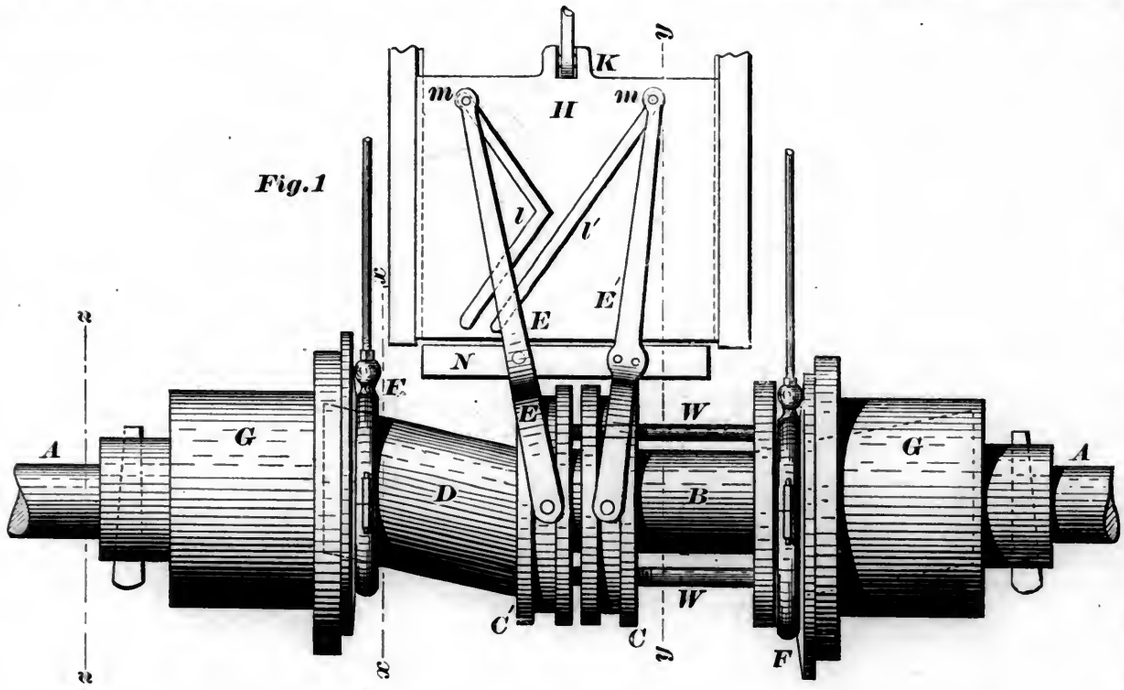


Fig. 2

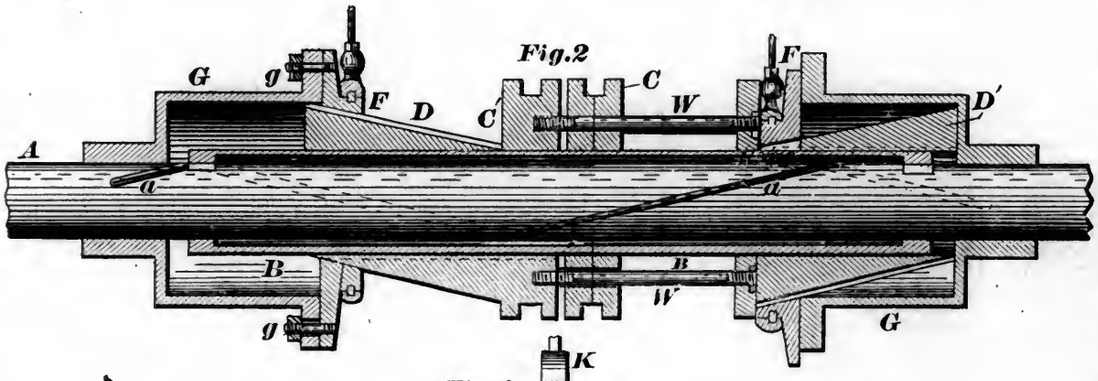


Fig. 4

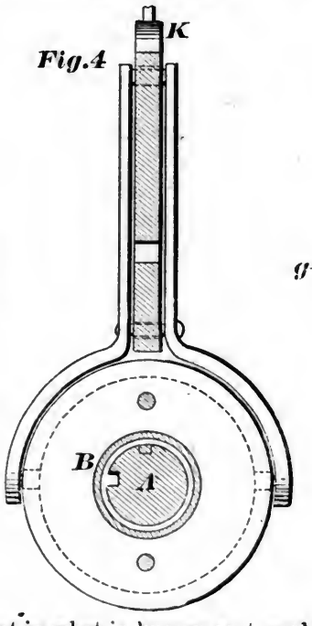


Fig. 3

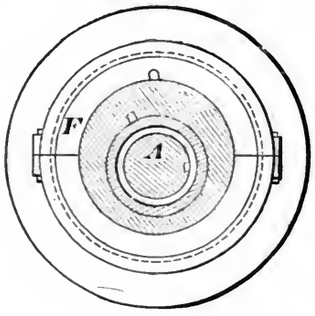
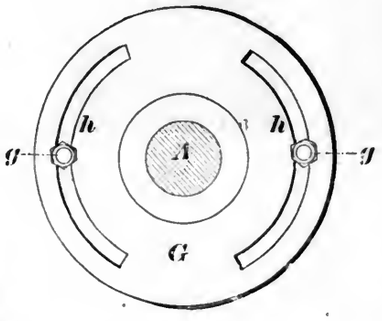


Fig. 5



Mr. Rock's invention is an improvement in what is known as "reversing-gear" for locomotive and other engines, and its object is to supersede the link-motion or other devices used for reversing or shortening the travel of the valve to cut off steam at different parts of the stroke of the piston, in order that the steam may be used expansively at any time when the full stroke is unnecessary.

It consists essentially of a spirally-grooved driving-shaft, a cylindrical sleeve adapted to engage the groove of the former, and an oblique cam-sleeve adapted to engage the first-mentioned clutch and act upon the incline-plane or wedge principle and convert a concentric collar into an eccentric, the combined parts mentioned having the function, under the influence of the operator, through the agency of a grooved rack and certain levers to arbitrarily affect the valve and give to the same the required throw.

Figure 1 is a plan view, showing the various parts composing the improvement. Fig. 2 is a longitudinal sectional view of the same. Fig. 3 is a transverse section on line $x\ x$ of Fig. 1. Fig. 4 is a transverse section on line $y\ y$ of Fig. 1. Fig. 5 is a transverse section on line $z\ z$ of Fig. 1. Similar reference letters denote like parts in all of the figures.

A is the driving-shaft of a locomotive-engine, provided with a spiral groove, a^2, which runs about its contour, groove need not run entire length of shaft, 6 inches on each end is enough. B is a cylindrical sleeve, which fits upon the shaft A, provided with a spline within, adapted to fit in the groove a^2 of the shaft A. This clutch has a feathered key adapted to fit a key within a groove or key-seat provided in a second sleeve, D, which serves the purpose of a cam. The sleeve B has a collar, C, provided with an annular groove adapted to receive the lugs of the lever E^1. D is a second sleeve, preferably cylindrical in general form and oblique to the axis of the spirally-grooved shaft when in position over the latter. It is provided with a collar, C^1, having an annular groove, also adapted, like the sleeve B, to receive lugs in the yoke of a lever. F is an eccentric, formed with a flange, which, when in place,

rests against a flange on an eccentric-guide. In this flange are secured bolts intended to pass through certain slots provided in said eccentric guide to secure the corresponding flanges together.

The eccentric F is provided with an oblique opening to receive the oblique portion of the clutch D, for a purpose to be hereinafter mentioned. G is a hollow cup-shaped wheel or housing, provided with a flange, and a hub all cylindrical in form, which, when in position, fits over the shaft A, to which it is keyed, and forms a hollow space for the reception of the sleeves D and B when it is desirable to reverse or shorten the stroke of the valve. H is a flat piece of metal adapted to fit loosely and move between the divided arms of the levers E E. It is provided on its longitudinal edges with V-shaped grooves, adapted to move in ways with edges correspondingly shaped, and rendered in some suitable manner adjustable, to provide against frictional wear. This rack has formed through its body slots to receive the rollers fixed in the ends of the levers E E^1. One of these slots is straight and oblique, preferably, to the longitudinal axis of the said rack, and the other V-shaped, preferably. As shown in the drawings, one arm of the slot *l* is nearly parallel to a slot shown and the other inclines in an equal angle in the opposite direction; but this is not essential, as their relative forms with relation to the longitudinal axis of the rack may be varied to suit circumstances. The lead given to the valves is determined by the shape of the slot *l*, in the rack. This may also be effected by making the spiral groove of the shaft serpentine, as well as spiral, in which case the long slot in the rack would remain straight, as shown. The connecting-bearing of lever E runs in the groove or slot *l*, while that of the one E^1 runs in the slot *l*^{1}. The levers E E^1, which are acted upon by the rack H, and which operate the clutches B and D, have each a yoke provided with pivoted square bolts, or round bolts provided with anti-friction rollers, which run in their respective grooves in sleeves B and D. The bifurcated arms of levers E E^1 are closed by bolts covered by anti-friction rollers which take into their respective slots, as before stated. When the said bearings or rollers are at the near ends of the slots they give full stroke to the valves, and when at the middle points between the two ends the valves are on the centers of the engine. The cab-lever, within reach of the operator, is attached to the clevis K of the rack H. N is a bar secured to the frame of the locomotive, which has formed in it segmental slots. Rivets pass through these slots and connect the two limbs of the levers E E^1, to form changeable fulcrums, so that, if necessary, a slight play may be allowed to said levers to assist in keeping the friction-rollers of the yoke in the center of the shaft. The bolts in the ends of the lever-arms traverse their respective slots as the rack H is moved back and forward, and cause the lugs in the yoke to follow or move longitudinally over the center of the shaft A. The sleeve B is provided with a lug or spline, which engages the spiral slot of the shaft A, whereby the said clutch is caused to revolve with said shaft, carrying with it the eccentric to the desired point to reverse the engine. The sleeves D are provided with keys to engage the key-seats of the eccentrics to prevent the latter from turning on said clutches. The eccentric-guide G is provided on its front face with slots through which bolts run, the extremes of which slots arrest the motion of the eccentrics. When the bolts are at the ends of the slots the valves may run at full stroke, and when so running said eccentrics are driven by the eccentric-guides, so that the sleeves B and D are relieved of the strain. When the bolts of the eccentrics move toward the centers of the slots to shorten the strokes of the valves the sleeves take up all lost motion before moving the eccentrics and bring the latter to the center, thereby taking up what lost motion there might be, so that the rim of the valve cannot be affected. The sleeves B and D when moved run into and out of opening of the eccentric-guide G. The eccentric F is provided with an annular flange to receive the straps. In the key-seats of the eccentric, are run keys, which hold said eccentric from turning, as before mentioned. The eccentric-guide G is fixed to the driving-shaft A by a suitable key. In the application of the invention to locomotive or other double engines, the opposite cam-clutches are connected by rods W, although, if preferred, they may be connected by a suitable sleeve. In order to work the valves for independent lead, the rack H may be dispensed with, and bell-crank or other suitable levers may be substituted and attached to the levers E E^1, in which case the stroke of the valve may be shortened with one lever and the engines reversed with the other. For independent lead the eccentric-guide slots must be concentric and the connecting-bolts must move in radial grooves formed in the eccentric.

The movement of the mechanism composing the invention may be briefly stated as follows: The rack H is moved by the operator who handles the cab-lever. The said rack influences the levers E E^1, which in turn by their yokes move the sleeves B and D in one and the same direction in line with the axis of the driving-shaft, while at the same time by the engagement of the keys of the clutch B and the spiral groove in said shaft a rotary movement is given to the said sleeves. The cam-clutches D in their axial movement convert the concentric collars into eccentrics, and as the former are united to the latter by splines or lugs they take the same rotary movement that is given to the said sleeves by the said groove in the shaft. The sleeves D move into the eccentric-guides G, which latter remain stationary, being keyed to the grooved shaft, and their eccentric grooves or slots guide and limit the movement of the said eccentrics. The eccentrics are connected to the valves in the usual manner. When the driving shaft of the engine moves, it rotates all of the parts placed about its axis.

Among the advantages that may be named for the invention are the following: The first cost of the construction will not exceed that of the link devices, and, being free from wear, repair expenses will be much less than attend the use of any link devices. There are no parts in motion while running, and consequently the durability of it is assured. It has few parts, and these are large and simple, consequently no special tools or machines are required. Direct connection being established with the valves, the least variation given in handling will be immediately felt, and the arrangement of the parts is such that no lost motion can affect the absolute perfection of the valve motion. The amount of lead given to any and all engines is optional with the builders and varied at the will of the engineer when driving loads of different weight; or the same lead may be made to follow the valve throughout its whole travel, whether long or short, and equally perfect upon the reverse or backward motion of the engine as the forward. Therefore, if the engine is for one class of labor only, the valve may be made to carry the same lead throughout, or lead may increase as may suit the fancy of the several builders. The engine doing labor of varying loads may be arranged to accommodate its valve-lead to the variation, at the will of the operator, if absolute lead is required, or if variable lead is required by my improvements, and each will be perfectly duplicated upon the reverse or backward motion of the enigne.

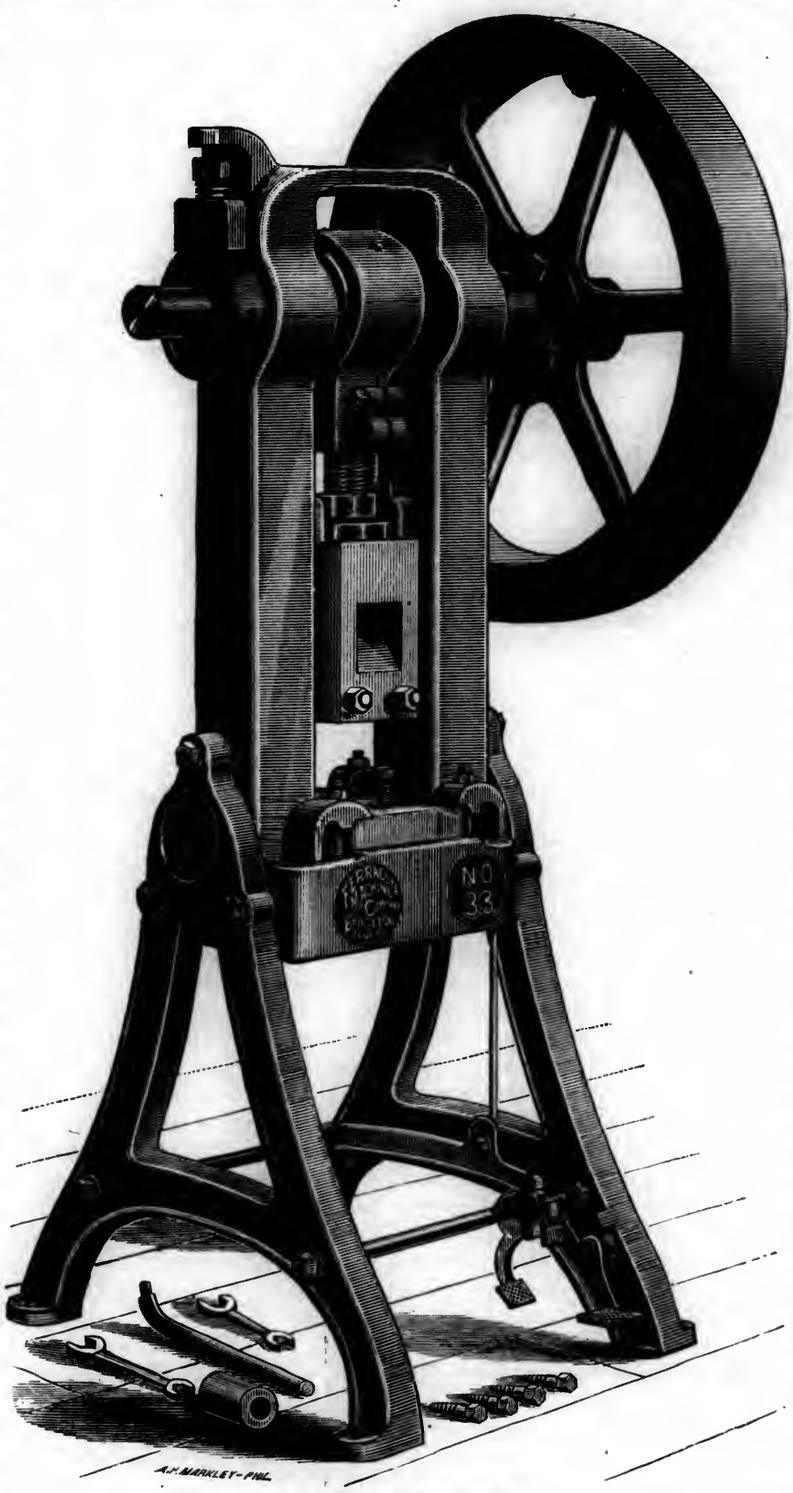
New Postage Rates.

On and after October 1, 1883, letter postage will be uniform at two cents for letters to any part of the United States. On and after July 1, 1883, money orders for $5 and under may be obtained for three cents. The order will be payable to bearer, and will be good for three months from date of issue; after that time the holder can get par value only by applying to the department at Washington. On the same date, the rate of money orders on all sums will be changed, and not exceeding $10 be procurable for eight cents, and from that to $100, the rate increasing up to 45 cents.

Embossing Power Presses.

THE press illustrated is the third in a series of four sizes (counting from smallest to largest), built by the Ferracute Machine Company, of Bridgeton, New Jersey. This style of press is adapted for such work as punching bar iron, washers, small nuts, etc., and for cutting out clock and gas-fixture parts, spoons, forks, jewelry, watch-cases, locks, brass goods, etc., and for embossing fancy work of various kinds, formerly done in drop presses. Press 33 is specially designed for cutting and forming watch-case covers and rings. All of these presses have solid columns, not cored out hollow, and are built very heavy and substantial in their working parts. Among their peculiar features may be mentioned: 1st, A new and improved automatic clutch, attached to both treadle and hand lever, very simple and durable, and so arranged that the shaft cannot make more than one revolution by one action of the levers. It consists of a lever or "button" connected with a sliding pin in the shaft. This pin engages with studs projecting from the fly wheel, which runs loose on the shaft when out of action. There being three studs in the wheel, the operator never has to wait more than one-third of a revolution for the press to start. The wheel pins have square heads, and can be revolved as they wear, thus giving greater life to the clutch than in other forms, and when worn out they are very cheaply replaced. This clutch is provided also with a "safety pin" to lock it, allowing the shaft to be revolved to any position, and the dies adjusted while the fly wheel is in motion, thus dispensing with the need of a counter-shaft. 2d, A reversible treadle lock, operated with the foot, by which the treadle can be fastened down for continuous running, or up for safety when the press is temporarily stopped. 3d, A treadle bumper and stop of India rubber for securing a noiseless and limited motion. 4th, An adjustable spring-brake which controls the motion of the press, and adapts it to various speeds. 5th, An adjustable ball and socket pitman, provided with an improved clamping device at upper end, thus avoiding the annoyance of loose joints incident to lock nuts, and giving the pressure from shaft to dies practically through solid metal.

The weight of Press 33 (see cut) is about 2,700 lbs.; weight of fly wheel about 750 lbs.; diameter of fly wheel 39 inches; width of fly wheel 6 inches; stroke of slide bar (variable to order), 1½ inches; adjustment of slide bar, 3 inches; size of each column, solid iron, 4½x7 inches; breaking strain of columns, about 2¼ millions of lbs. The smallest press of this series weighs about 800 lbs., and the largest 5,100 lbs.



EMBOSSING POWER PRESS.

The Ferracute Machine Co. manufacture about 75 sizes and kinds of presses for general sheet metal work, all of which are illustrated and described in their new catalogue which they furnish gratuitously on application.

Against Rust.

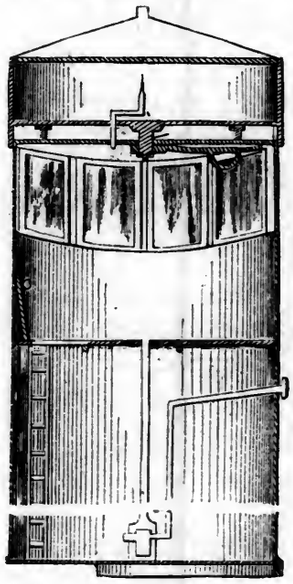
WHAT promises to be an invention of general utility has been patented in Germany, in the shape of a protective against rust. It is made in the following manner: The rough oils obtained in the dry distillation of certain bituminous substances, of which brown coal and peat are among the number, are distilled further, and into the oil thus procured one-quarter its quantity of rolled india rubber, cut into small strips, is thrown in and left for eight days. At the end of this time, the mass of oil and saturated India rubber is subjected to the action of vulcan oil, or something else having a similar effect, until thoroughly mixed into a uniform substance. If metal surfaces are thinly covered with this substance they are said to be perfectly protected against rust, and the process of oxidation is also said to be arrested and rust already formed removed, by the application of a thin coating of this mixture.

Another German patent protects the manufacture of a mixture of common linseed oil paint with ten per cent of burnt magnesia, baryta, or strontian, added to it while cold, along with a quantity of mineral oil. In the mixture thus formed, it is stated that the free acids of the paint are neutralized, and, on account of the lasting alkaline reaction, its use, as a coating on iron, is a protective against rust. To prevent iron placed in the earth from rust our Teutonic relatives are painting it with a mixture

of one-hundred parts of pine-rosin, twenty-five of gutta-percha, fifty of paraffine, and twenty parts of magnesia and mineral oil. Vaseline is found to prevent the drying of paint containing from twenty to thirty per cent of magnesia or burnt dolomite, used on some parts of machinery.

Parkhill's Watch Tower and Signal Lantern.

THE inventor of the new and ingeniously devised watch tower and signal lantern best designated by his name, is MR. CLAIR S. PARKHILL, of Hornellsville, N. Y., who has secured letters patent for the protection of his rights therein.



His invention relates to new and useful improvements in watch towers and signal lanterns, to prevent accidents at railroad crossings and other dangerous places, and consists in novel features of construction, combination and arrangement of parts.

The lantern or turret in Mr. Parkhill's invention stands on the top of the tower, and is supported and turned around by means of a pivot which extends through the ceiling of the watchman's coop. A lever is firmly secured to the lantern, which may be supported by four rollers run on a track on the floor. The sheet-iron frame of the lantern rests on arms which are bent to allow the turret or lantern to revolve sufficiently far to present or expose at will either the word "Danger" or "Safety," without the possibility of the arms hitting a gas-pipe which passes from the coop below to the turret above.

The watchman's coop is reached by means of a ladder, through a trap-door raised and held open by means of a spring, and which, after the watchman has entered his coop, is closed and fastened in a position even with the floor, so that it can be walked upon. A trap-door in the ceiling of the watchman's coop opens downward and gives access to the turret. Inside the coop, directly overhead, is a lever—whose use will be explained presently—held at proper places by means of a spring bolt which catches into notches. Windows enable the watchman to see in every direction. Arrangements for his comfort are easily made by a small furnace in the compartments below the coop, or by means of a gas-stove within it.

Outside of the coop is a large gong, which is sounded whenever the turret is moved in any direction by means of the lever spoken of above as being inside the watchman's coop, directly overhead, and held at proper places by means of a spring bolt. Should the watchman need to sound the gong while the turret is stationary, he could do this by means of a crank inside the coop. Every emergency is thus provided for.

The room containing the ladder for the ascent of the watchman to his coop can be used for storing coal, flags and other things, and as a place of rest and shelter for switchmen. Of course, when the existence of this room would be needless and an impediment, the watchman's coop and the turret or lantern above could be supported on iron columns, made of sufficient height to enable the watchman to command an unobstructed view of trains coming from either direction.

We scarcely need add that an arm, beam, or any instrument to act as a gate across the street or sidewalk could be connected with the turret and lever working the gong, or either of them, and worked so as to be opened and closed, or raised and lowered by the watchman in the tower independently, or with the turning of the turret and sounding of the gong.

The intention, simplicity and effectiveness of Mr. Parkhill's invention commend it to the attention of persons interested in the improvement of railroad construction.

Important to Carriage Drivers and Carriage Owners.

THOMSON'S Security Rein Holder, advertised in our columns, is one of those little conveniences which when once put into practical use, surprise us that we have so long been able to do without them.

Every horseman has been bothered to know how to secure the reins during his temporary absence from his carriage; and so great has been the need of some device for this purpose that over one hundred patents have been taken out in the last twenty-five years for Rein-Holders. Yet all these have been so awkward or inadequate that one rarely sees a Rein-Holder on a carriage.

Thomson's invention, however, seems to be all that is desired, and soon will be a necessary part of every carriage. It is warmly approved and is adopted by the celebrated Brewsters—the Brockett & Tuttle Co.—the Studebakers and many other leading carriage manufacturers.

For illustration and particulars refer to advertisement.

SCIENTIFIC men of all nations are invited to compete for the Volta prize—30,000f. or $6,000—of the Academy of Sciences, Paris, which will be awarded in December, 1887. This prize was founded by the decree of June 11, 1882, and is for the discovery or invention of whatever shall render electricity applicable economically to one of the following objects: Heat, light, chemical action, mechanical force, the transmission of messages, or the treatment of sick persons. No attention will be paid to what may be sent in by candidates later than June 30, 1887.

PROMINENT CAR AND LOCOMOTIVE BUILDERS.

Rogers Locomotive Machine Works, Paterson, N. J.
Jackson & Sharp Company, Wilmington, Del.
W. C. Allison, Junction Car Works and Flue Mill, Philadelphia, Pa.
The John Stephenson Co. (Lim.) New York City.
Baldwin Locomotive Works: Burnham, Perry, Williams & Co., Phila., Pa.
Adrian Car Works, Adrian, Mich.
W. C. Allison, Philadelphia, Pa.
Altoona Car Works, Altoona, Pa.
Atlanta Machine Works, Atlanta, Ga.
Barney & Smith Manufacturing Co., Dayton, Ohio.
Beaver Falls Car Co., Beaver Falls, Pa.
Bradley, Osgood, Worcester, Mass.
J. G. Brill & Co., Philadelphia, Pa.
Brownell & Wight Car Co., St. Louis, Mo.
Cleveland Bridge and Car Works, Cleveland, Ohio.
Erie Car Works, Erie, Pa.
Gilbert & Bush Co., Troy, N. Y.
Harlan & Hollingsworth Co., Wilmington, Del.
Haskell & Barker Car Co., Michigan City, Mich.
Hazelton Car Works, Hazelton, Pa.
Indianapolis Car and Manufacturing Co., Indianapolis, Ind.
Jackson & Sharp Co., Wilmington, Del.
Jones Car Manufacturing Co., Schenectady, N. Y.
Keith Manufacturing Co., West Sandwich, Mass.
Kingston Car Works Co., Kingston, Canada.
Laconia Car Co., Laconia, N. H.
Lima Car Co., Lima, Ohio.
Mansfield Machine Works, Mansfield, Ohio.
Pullman Car Co., Pullman, Ill.

Baldwin Locomotive Works, Philadelphia, Pa.
Brooks Locomotive Works, Dunkirk, N. Y.
M. M. Buck & Co., St. Louis, Mo.
Muskegon Car and Engine Works, Muskegon, Mich.
Portland Locomotive Works, Portland, Maine.
Rogers Locomotive and Machine Works, Paterson, N. J.

PHELPS, DODGE & CO.,

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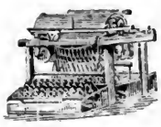
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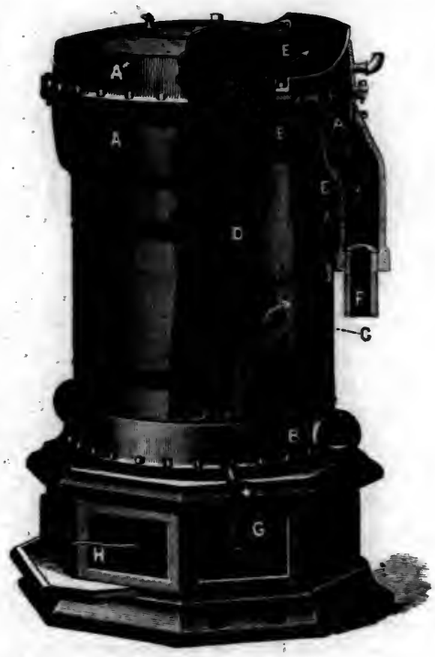
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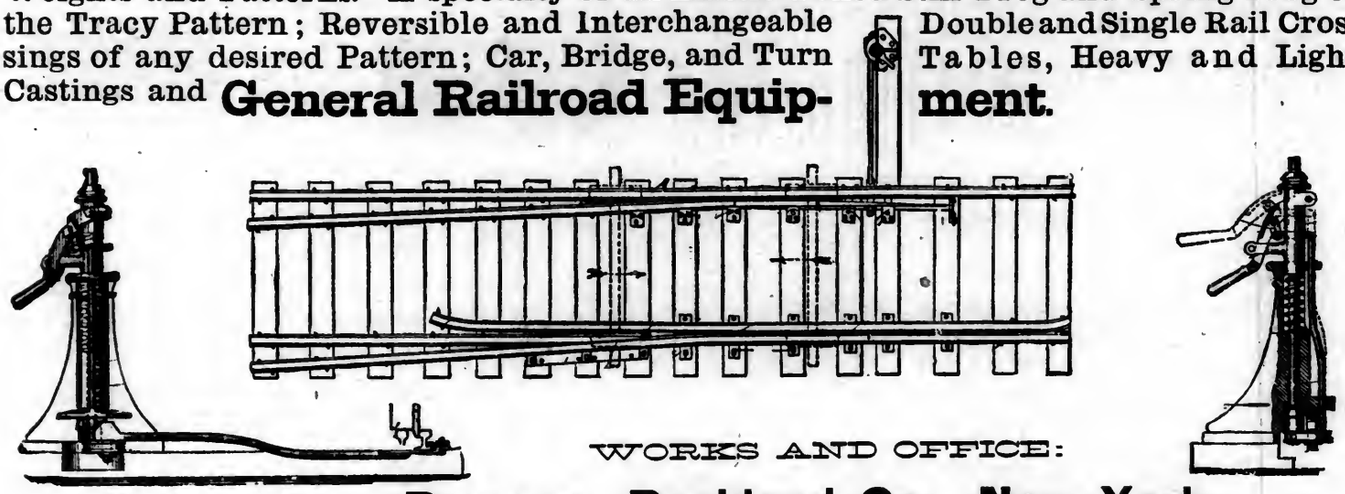
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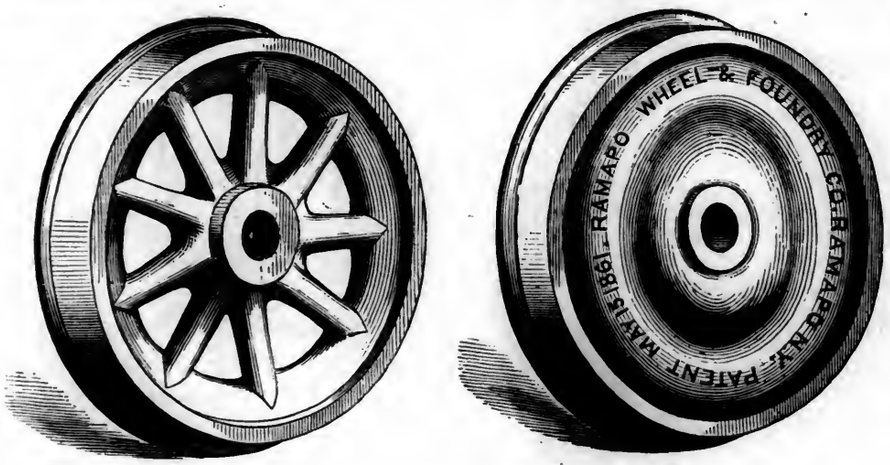
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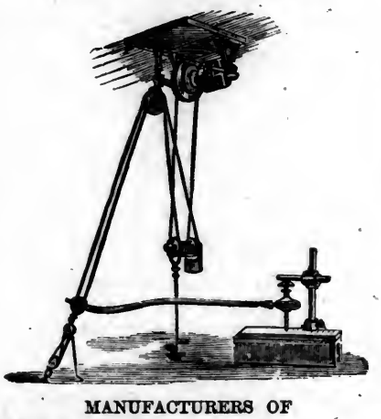
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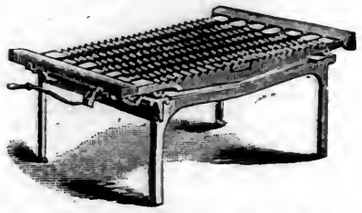
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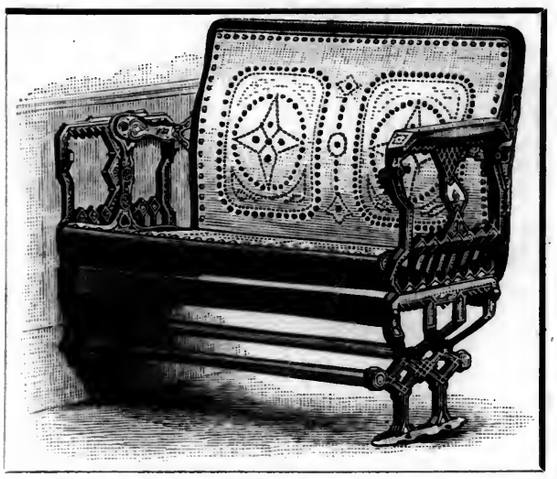
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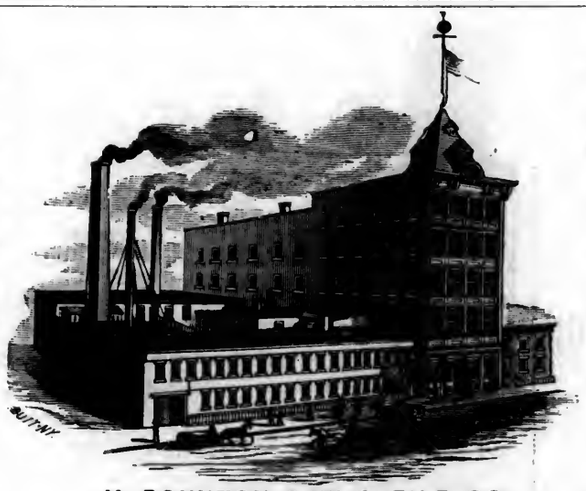
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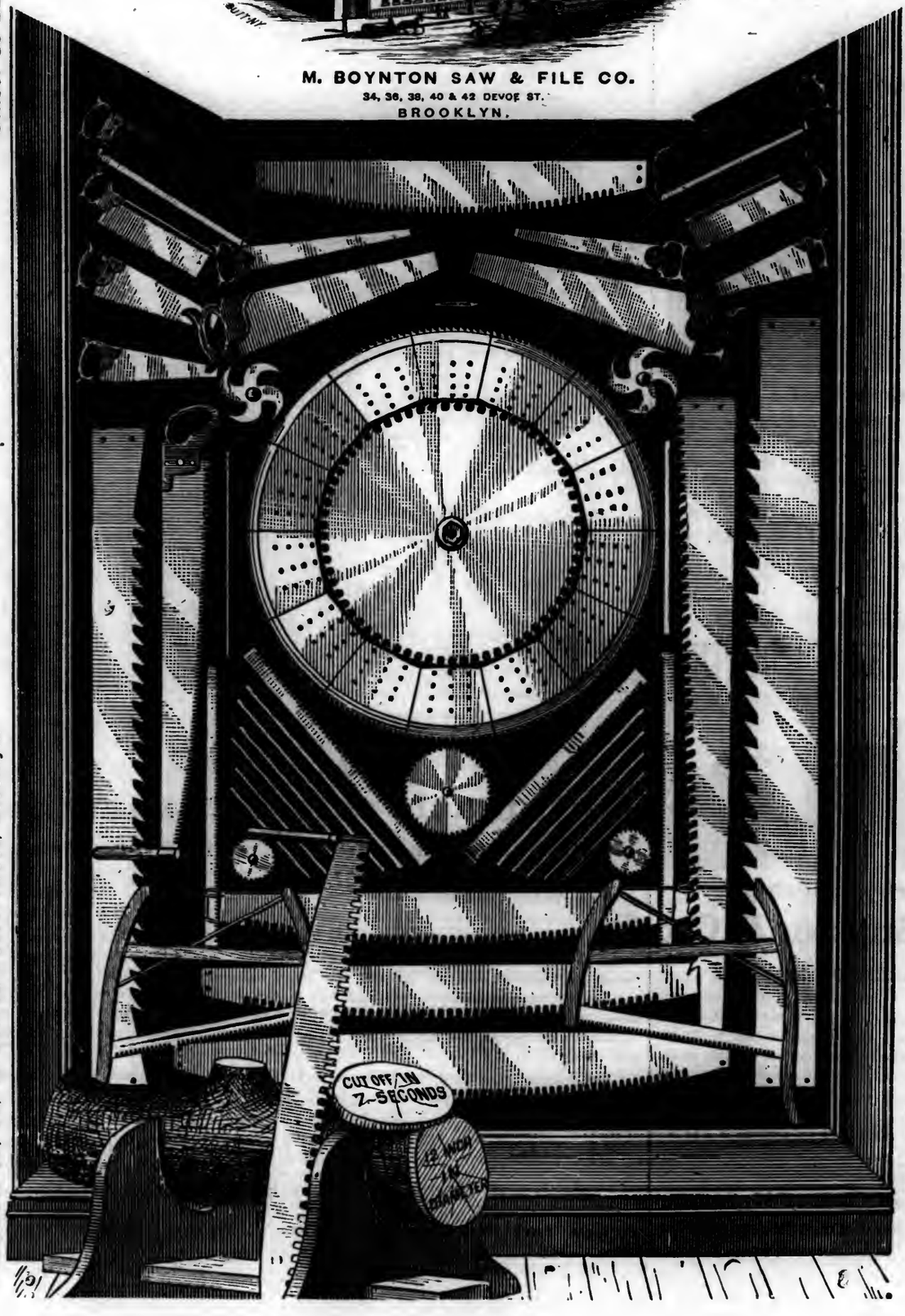
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AMERICAN Railroad Journal

·ESTABLISHED·1831·

Steam Navigation, Commerce and Finance, Tramways, New Inventions, Machinery, Mining.

WHOLE No. 2,452.] NEW YORK, JULY, 1883. [VOLUME LVII.—No. 4.

WE invite railroad officers to send us notice of elections, transfers, appointments, resignations, etc.; and all our readers would oblige us by furnishing us with any items of news which may come to their knowledge and are of a suitable nature for our columns. It is our intention to publish monthly full and accurate information regarding those enterprises and industries to which the AMERICAN RAILROAD JOURNAL is devoted, and to effect this end we solicit the co-operation of readers interested therein. We aim specially to record all new railway enterprises in the United States and Canada, and to note the progress of construction on all new roads and extensions; and we request those concerned in railway building to give us early information concerning the above, that our reports may be as complete as possible.

ORGANIZATION.

THE Farmington and Carrabasett Railroad Co. was organized at New Portland, Me., on the 28th ult., by the election of the following board of directors: I. W. Green, Eustis; E. S. Winter, M. B. Potter, A. Knapp, Kingfield; A. Davis, L. Vaughan, J. Emery, New Portland; J. M. Burbank, Freeman; G. N. Clark, E. R. Luce, A. J. Sweet, New Vineyard. D. M. Bonney of Farmington was chosen president, and E. S. Winter of Kingfield, treasurer. The object of this organization is the construction of a railroad from Farmington via New Vineyard to Portland and Kingfield. The distance is 18 miles.

AT the annual meeting of the stockholders of the Shore Line Railroad Company, held in New Haven, Conn., on the 29th ult., the following gentlemen were chosen directors for the ensuing year: S. B. Chittenden and C. G. Langdon of New York; E. H. Trowbridge, W. F. Bartlett, H. L. Hotchkiss, W. F. Day and A. D. Osborne of New Haven. The directors chose S. B. Chittenden president, E. H. Trowbridge vice-president, and W. F. Day treasurer and transfer agent.

THE corporators under the new charter recently granted by the Massachusetts Legislature to the Cape Cod Ship Canal Co., met in Boston on the 5th inst. and elected the following board of directors: W. Seward, Jr., J. T. Holle, S. Fessenden, G. S. Hall, E. Reed, W. A. Clark, Jr., and J. Styles. Subsequently, the following officers were chosen: President, Wm. Seward, Jr., of New York; vice-president, J. P. Holle, of Boston; treasurer, S. Fessenden, of Sandwich.

THE directors of the Cincinnati and Eastern Railroad Company, elected on the 2d inst., are: W. R. McGill, O. H. Hardin, J. D. Ellison, H. Lewis, E. W. Woodward, P. E. Roach, L. D. Drake, J. H. Rhoades, F. N. Baldwin, A. H. Bugher, G. G. Roots, L. Glenn, W. A. Proctor, M. Jamieson and S. Peike. Subsequently, W. R. McGill was elected president and W. Mansfield, secretary.

THE stockholders of the Pennsylvania, Slatington and New England Railroad Company, at their recent annual meeting elected the following directors: G. M. Wright, E. G. R. Applegate, N. L. Rue, S. M. Schenck, G. W. Mackey, J. Loomis, F. M. Ward, J. F. Ward, J. W. Rutherford, C. V. Moore and J. Linn. J. F. Ward was elected president in place of N. L. Rue, resigned.

AT the annual meeting of the Philadelphia, Reading and Pottsville Telegraph Company, held in Reading, Penn., on the 3d inst., the following officers were elected for the ensuing year: President, F. B. Gowen; directors, J. B. Lippincott, H. Lewis, E. C. Knight, and G. A. Nicolls; secretary, H. Hancock; treasurer, J. Welch.

THE permanent organization of the Salina, Lincoln and Fremont Railroad Co. has been completed as follows: M. Dickenson, of Wahoo, president; S. C. Smith, Beatrice, first vice-president; O. P. Hamilton, Salina, Kan., second vice-president; N. C. Brock, Lincoln, treasurer; C. T. Boggs, Lincoln, secretary.

THE officers of the New York and Harlem Railroad Company, elected on the 22d ult., are: Wm. H. Vanderbilt, president; C. Vanderbilt, vice-president and secretary, and E. V. W. Rossiter, treasurer. This is the only road of which Wm. H. Vanderbilt is now president.

THE directors of the Winchester and Strasburg Railroad Company, elected on the 3d inst., are: T. Whitridge, H. Sisson, J. A. Sherrard, G. A. Hupp and J. Gregg. President, Robert Garrett; secretary and treasurer, Wm. H. Ijams.

THE Canada Southern Railway Company was organized on the 22d ult. by the election of C. Vanderbilt, president, C. F. Cox, vice-pres't, N. Kingsmill, secretary, and Allyn Cox, treasurer.

CONSTRUCTION.

THE Streets Run Branch of the Baltimore and Ohio Railroad, which was opened for freight business on the 2d inst., is the cut-off between Pittsburgh and Wheeling, and enables that company to compete with other roads in the shipment of freight from Pittsburgh to the West. Hitherto any freight for the West received in Pittsburgh had to be transferred 150 miles east to Cumberland and 200 miles west to Wheeling, but by the Streets Run Branch this distance is reduced to only 60 miles. At present only freight will be carried over the new route. After a month or two, passenger trains will also be run. The company propose to erect a new passenger station, and will, during the next year, build an iron bridge across the Monongahela River, to connect the Streets Run Branch with the main tracks. Until that work is finished, freight and passengers will be transferred by boat.

MOST of the contracts for the construction of the Philadelphia extension of the Baltimore and Ohio Railroad have been let. Wilcox & Driesbach, of Bradford, Pa., are stated to have secured a portion of the work at $1,500,000. The company in making the lettings to the several contractors, stipulated to have the line in running order in the winter of 1884-5.

THE new line between Chicago and Detroit, which was opened on the 8th inst., consists of the Wabash Railway from Detroit to Auburn Junction, 126 miles, and the Baltimore and Ohio from Auburn Junction to Chicago, 146 miles, making the distance from Detroit to Chicago 272 miles.

THE last rail completing the Kansas City and Memphis Railway between the St. Louis, Iron Mountain and Southern Railway crossing at Hoxie and Springfield, Mo., was laid on the 30th ult. It is expected that the 17 miles of track remaining to complete the road to Memphis will be finished by the 1st of September.

THE Fitchburg Railroad now has its second track in operation to Orange, 87 miles from Boston, and the rails are down to a point two miles east of Miller's Falls.

IT is stated that trains will be run over the Thomasville, Tallapoosa and Gulf Railroad, from Tallahassee to Thomasville, Florida, by January, 1884.

A LARGE number of hands are now employed on the Tampa end of the South Florida Railroad. The force will soon be increased to about 1,000.

THE length of the Louisiana and Arkansas Railroad has been increased from 60 to 120 miles.

PERSONAL.

THE various roads constituting the Wabash system have been rearranged and grouped into four divisions to be known as the Eastern, Middle, Northern and Western. They will be officered as follows: Eastern Division—G. W. Stevens, sup't, at Peru, Ind., with D. G. Moore at Cairo, Ill., and B. F. Matthias at Rantoul as assistants. Middle Division—H. F. Clark, sup't, at Springfield, Ill., with N. L. Tompkins at Forest, and F. D. Schermerhorn, of Quincy, as assistants. Northern Division—E. N. Armstrong, sup't, at Peoria, Ill., with E. B. Hyde at Havana, as assistant. Western Division—R. S. Miner, sup't, at Moberly, Mo., with E. Dresser at Stanberry, as assistant. In addition to these, the Des Moines and Northwestern Railroad, narrow-gauge, will be in charge of C. F. Meek, as assistant sup't. Robert Andrews will remain general superintendent of the system.

THE President has appointed Col. Samuel B. Holabird to be Quartermaster General to succeed Gen'l Rufus Ingalls, retired. He also appointed First Lieut. Charles Ingalls, Sixth Infantry, to be Captain and Assistant Quartermaster General.

THE officers of the Northern Pacific Terminal Company of Oregon, recently chosen, are: E. D. Adams, president; C. H. Prescott, vice-president; G. S. Jones, treasurer, and R. E. O'Brien, manager.

S. N. SCHANK, vice-pres't of the Pennsylvania, Slatington and New England Railroad, has been elected a director of the Highland Junction and Storm King Bridge Railroad Co.

W. W. HEAFFORD has been appointed Canadian Passenger Agent of the Chicago, Milwaukee and St. Paul Railway Co., with headquarters at Toronto.

F. A. STEVENS, of Boston, Mass., has been appointed State Railroad Commissioner in place of C. Herschel, whose term has expired.

T. GUCKER has been appointed sup't of the Philadelphia Division of the Pennsylvania Railroad, to take effect on the 1st of August.

R. CARROLL has been appointed Gen'l Sup't of the Cincinnati, New Orleans and Texas Pacific Railroad and all its branches.

H. M. KOCHERSPERGER, of Philadelphia, has been appointed auditor of the New York and New England Railroad Co.

ERASTUS YOUNG has been appointed auditor of the Union Pacific Railway Company.

The Late Chester W. Chapin.

SINCE the production of our last issue, a gentleman eminent in the development of the American railroad system has passed away, and it is proper that we should devote space in this number, to a short sketch of his career.

The late Chester W. Chapin, ex-president of the Boston and Albany Railroad, died at Springfield, Massachusetts, on the tenth day of June, 1883. His long and useful life was ended by a stroke of paralysis.

Mr. Chapin was born at Ludlow, Mass., December 16, 1798, the son of a farmer, who, while he was a boy, made him useful on the farm during the summer, but took care that he attended the district school in winter. When the time came for the young man to leave home, he began a business life, which proved very congenial to his tastes; and when about twenty-nine years of age, he had accumulated the means of becoming a proprietor in the stage line between Hartford and Brattleboro. This was in 1827, from which time until about three years later, the firm of Sargent & Chapin provided the service indicated. In 1831 Mr. Chapin bought two steamers plying on the Connecticut River. He owned and run these until 1844, when the opening of the railroad between Hartford and Springfield rendered the continuance of the service unnecessary. During several years previous to this time, he had interested himself in railroad matters, and was made a director of the Hartford and Springfield Railroad, three years before its completion in 1844. In 1846 he was elected a director of the Connecticut River Railroad Company, and in the same year or about that time, contracted to carry the mails between St. Louis and Terre Haute, Indiana. From 1846 to 1872, Mr. Chapin acted as director of the Agawam Bank, which he founded in the first-named of these years, and of which he was for some time president. In 1850 he became a director of the Western Railroad, and was president of the Connecticut River Railroad from 1850 to 1854. Upon his election as president of the Western Railroad, in 1854, he devoted his energies to the building up of the line between Boston and Albany. Its roadway and rolling-stock underwent prompt improvement, and a year after his incumbency as president began, he had negotiated in England a loan of half a million dollars, with which he completed a double track between Springfield and Albany. The Boston and Albany Railroad, first known by this name in 1867, was formed by the consolidation of the Western and the Boston and Worcester railroads, a step mainly due to Mr. Chapin's enterprising policy. In 1872 Mr. Chapin became president of the Chapin Banking and Trust Company. He resigned his presidency of the Boston and Albany Railroad in 1878, but was numbered among its directors at the time of his death. His wealth was invested largely in railroad and steamboat enterprises, with a sagacity which seldom or never failed. Mr. Chapin served the community among whom he lived, in several public positions, including membership in the constitutional convention of 1853, and in the Forty-fourth Congress. He was a Democrat in politics. His charities were exemplary. Among the more remarkable of these, was his endowment of the presidency of Amherst College with bonds and stocks to the value of five thousand dollars. Chester W. Chapin, son of the deceased railroad magnate, is president of the New York and New Haven Steamboat Co.

THE general passenger agents of the Western lines have agreed upon the following charges for excess baggage, which are reductions from previous rates: Fifteen cents per hundred pounds, for any distance between one and thirty miles; twenty-five cents per hundred pounds, for distances between thirty-one and fifty miles, no charges to be less than twenty-five cents. Baggage going more than fifty miles will be charged according to the old agreement. The old tariff rate was twenty-five cents for distances less than fifty miles, the change having been made with reference to small distances.

Correspondence.

COMMUNICATIONS are solicited for this department on all subjects pertaining to Railroads, Steam Navigation, Machinery, Manufactures, etc. No attention will be paid to communications unless the name and address of the writer is furnished us, though if desired, they will be withheld from publication. We assume no responsibility for statements made by correspondents, and we do not necessarily endorse ideas advanced by them. Under these conditions we think it of value to our readers to devote a liberal space to the free discussion by others—whose opinions may be at variance with our own—of subjects pertinent to this department of the AMERICAN RAILROAD JOURNAL.]

OFFICE OF CANADA ATLANTIC RAILWAY,
OTTAWA, June 23, 1883.

Editor American Railroad Journal:

SIR:—I notice in June number of the JOURNAL, inquiries concerning the engine that on the 17th day of May last, hauled from Alexandria to Coteau—upon which portion we found the hardest grade of this road—a train of forty cars of freight, the gross weight of which was 792 tons. The distance was twenty-three miles and the time occupied was, including stop of eight minutes at Glen Robertson, and eight minutes crossing express train at St. Polycarpe, one hour and twenty-five minutes. The engine is called the Mansfield, and was built at the Mason Machine Works, Taunton, Mass., in 1876. It is, I think, called by them a truck engine, and is a modification of the Fairlie type. Cylinders are 16x24, has six coupled driver four feet diameter. Heating surface of fire-box is: Length, 5 feet 6 inches; depth, 5 feet 6 inches; width, 4 feet. Number tubes 162, two inch by twelve feet eight inches in length. This large heating surface will explain to your correspondent how the engine was able to keep up such a rapid expenditure of steam, for so long a time. The boiler pressure was maintained at 130° throughout the trip.

Your correspondent can obtain a more full description of the engine by addressing the makers, and I presume can also obtain a photograph of the engine, should he desire it, of the same parties.

M. DONALDSON.
Canada Atlantic Railway.

The Two First American Locomotives.

MR. DANIEL MATHEW, who lives at No. 1161 Howard street, San Francisco, has sent the publishers a letter, from Chicago, dated June 19, 1883. The old gentleman writes with vim, and in a hand remarkable for its steadiness and legibility. This is what he says:—

"Gentlemen, I take the liberty of dropping you this note and my card of the two first locomotive engines built in the United States, and the two first to draw trains of cars in the United States; built by the West Point Foundry Shops, in the City of New York in 1830, and were exhibited under steam at the shops foot of Beach street when finished, before shipping them to the Charleston and Harrisburgh Railway in South Carolina.

"The papers of the day published the trials for the information of those taking an interest in the then infant project in this country. I was the one to exhibit and handle the engines, as shown in the card. I was the engineer that run the first train over the M. and H. R. R. from Albany to Schenectady in 1831, and was a subscriber to the RAILROAD JOURNAL in 1831, from Schenectady, N. Y., where I hailed from for many years."

An Early Projector of the Brooklyn Bridge.

NEW YORK, July 2, 1883.

Editor American Railroad Journal:—

SIR: Having noticed some recent articles in the newspapers, touching the Brooklyn Bridge and its early projectors and advocates—none of which recent articles appear to go back far enough to reach and call to remembrance some of the first and really earnest published endeavors in respect to the Bridge—I therefore have turned to some instances of nearly fifty years ago (1834) which I had noticed in my former readings on the subject of bridges and railroads, of which the most important is an article of some length in your JOURNAL, Vol. 4, No. 1, page 4, of Jan. 10th, 1835, signed by W. Lake, Civil Engineer and Architect, No. 23 Nassau street, New York, and dated in December, 1834, in which he dwells upon the propriety, practicability and future needs of a bridge which could be built in the vicinity of Fulton Ferry, and says that plans thereof can be seen at his office, No. 23 Nassau street; but admits that some improvements might be made by consultation with skillful engineers. He also suggests that the bridge could be made considerably higher by extending the approaches one thousand (1,000) feet on each end. His plan as set forth therein, is of a "suspension" bridge with one *center* pier; for the foundation of which he gives the soundings as taken from Blunt's chart of the East River, and says that such a foundation could be well and substantially built by the use of a coffer-dam. This is the earliest *practical* reference to the present bridge, its plan and location, that I find among any of my notes. Subsequently, in No. 45, of Nov. 14, 1835, page 381, of same volume of your JOURNAL, is another article on the subject of a Brooklyn Bridge, and referring to Mr. Lake's plan of a "suspension" bridge. At that early day street railroads attracted so little attention that no provision was made for one by Mr. Lake. He simply provided for two center foot-ways, and two outside carriage-ways. With the exception of a center pier in the river, the plan did not differ materially from the present bridge, further than that the intellect and experience of subsequent workers have evolved improvement, conforming to the progress of time, in size, cost and capacity of the work.

Respectfully, G. B.

AS AN instance of the business lately done in trade dollars, a prominent Philadelphia banker says that a broker bought in New York, 10,000 trade dollars for $9,000, and sold them for $9,500. The manufacturers, of course, paid them out to their hands. A not inconsiderable profit at the expense of the operatives. The officers of the Mint say they have been instructed not to receive trade dollars except as bullion. At the Mint, silver in lots of less than 10,000 ounces, is bought at ninety-nine cents per ounce. If the Mint bought 10,000 trade dollars for $10,000, it would lose by the transaction, $133.75. The trade dollar weighs 420 grains, or seven-eighths of an ounce. One thousand trade dollars weigh, therefore, 875 ounces. As an ounce of silver is worth 99 cents, 875 ounces (or 1,000 trade dollars) are worth only $866,25, or $133.75 less than $1,000. This, therefore, regulates the market value of the trade dollar and makes it worth seven-eighths of ninety-nine cents, or 86.625 cents.

THE increasing demand for hurried work, especially in railroad paint shops, is causing some complaint, not only among the painters, who find it difficult to produce the best work in the limited time allowed them, but also among the manufacturers, who are put to considerable trouble in endeavoring to satisfy the joint demands of durability and speed. Painters have before expressed their grievances over this matter in our columns, and there seems to be no doubt that it is often impossible for them to do themselves and their work justice, under the restrictions with which they are hampered. And it is not a wise economy to gain a few days' time at the sacrifice of durability and appearance, which must inevitably follow an undue hastening of the painting process. It should be remembered that when the drying property of a varnish is hastened it must have less durability; and in a class of work where this quality is so important as it is in the painting of railroad cars, it becomes a serious question whether the time gained in hurrying the car out of the paint shop, is not more than lost by its consequent early return for repainting.—*Coach Painter.*

IT is expected that the journey from Paris to Constantinople will soon be made in seventy-five hours. A through train with forty-two beds now runs twice a week.

American Railroad Journal,

PUBLISHED MONTHLY BY THE

PHENIX PUBLISHING CO. OF N. Y.

—AT—

No. 245 BROADWAY, NEW-YORK.

GEO. F. SWAIN, PRESIDENT. L. FAIRBANKS, JR., VICE-PRESIDENT.
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1 col. (9⅞ in.)	26.00	72.00	130.00	235.00
¼ page	15.00	40.00	70.00	120.00
½ page	26.00	72.00	130.00	235.00
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THE AMERICAN RAILROAD JOURNAL is sent regularly to all whose names appear on our books as those of subscribers, until they close their subscription by communication with the publishers.

ADVERTISERS and subscribers are respectfully cautioned against making payments to any person professing to represent this journal, excepting he is able to show a written order from this office, duly signed by the president or secretary.

ALL copy for publication in the AMERICAN RAILROAD JOURNAL, both advertisements and articles, should be mailed to reach the publishers not later than the en l of the month previous to that in which it is expected to appear. For example, copy for the August number should be mailed to reach us by the thirty-first of July, at the latest. There is no fear of being too early in sending, and our correspondents would oblige us by anticipating, as far as possible, the last day on which we can receive copy.

NEW YORK, JULY, 1883.

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Sunday Trains.

THE following article from the *Boston Post* of June 5th, brings to public attention an old subject.

STANDING ON THE TRACK.

For the first time in its history the Housatonic Railroad Company, an enterprising corporation, has been running for several weeks Sunday trains its whole length, from Bridgeport to Pittsfield, accommodating a great deal of legitimate travel, bringing the Sunday papers from New York, performing a great many other kindly offices that were well appreciated by the public. But somehow the service, while tending to invite the favor of the road's patrons generally, did not appeal to the good opinion of the clergy in a number of rural towns through which the trains passed. They made an united and earnest protest against the innovation. They remonstrated and they condemned. They presented petitions to the company, but as they were not regarded as forming the controlling part of that public which well managed corporations acknowledge as master, the Sunday trains continued to run as usual. The town authorities of Berkshire, or some part of it touched by the offending train, therefore did assemble in their majesty last Sunday, and with the warrant of some remnant of an ancient blue law, turn back the wheels of progress, or, rather, prevent them from rolling beyond the Connecticut line, North Canaan being the last town to be visited. We have not as yet been favored with a detailed report of the full measure of the company's offending, but we cannot understand, upon the face of this proceeding, why the Sunday passenger train north should not be allowed to run to the end of its route as well as the Sunday milk train south. Human freight, hardly less than lacteal freight, gets very much soured by having to wait till Monday for transportation that might, except for certain fast-fading prejudices, be just as well supplied Sunday. When Sunday transportation is furnished, it never fails to accommodate those who travel as much on account of necessity as do those who ride in a dirty car behind a milk freight, and stop five minutes at each station for additional supplies. Perhaps the Sunday train was too rapid, and did not proceed with that hearse-like solemnity characteristic of a "mixed" accommodation. There are a great many inferences that may be drawn, but the Berkshire clergy have the key to the situation, and they have not to our knowledge taken any but their congregations into the secret. The clergy teaches that life is but a span, that we are here to-day and in the hereafter to-morrow, and yet they would shut mankind off from one-seventh of the opportunities to make the most of its fleeting existence. Had the trains been running, probably Irving would not have written his "Wet Sunday in a Country Inn," and while we should regret to give up the sketch, there are tens of thousands who would gladly forego the experience. The Berkshire clergy must know that their victory is but temporary. Sunday trains are going to come, and come to stay, wherever there are railroads for them to run on; and we would advise the clergy to "look out for the engine when the bell rings."

The running of Sunday trains has given many good persons anxious thought. The most strenuous advocates for them cannot urge that they are an unmixed good. On the other hand, the most bitter opponents cannot claim that they are an unmixed evil. We can understand why the "old Puritans," as they are called, do not endorse the running of trains through their quiet villages on Sunday, as they have been brought up to regard the day holy unto the Lord, and have no use for such trains. Many of them have never seen beyond their own potato hills, and have no desire to see further. There is no question but that such oppose these trains actuated, as they believe, by a good conscience. They take refuge behind conscience. So did Paul when he persecuted the Christians, he verily believing that he was doing God a great service. These men pride themselves upon their honesty because they have the approval of conscience. It may be well for such to know that conscience as understood by us is not always a safe guide unless illuminated by a divine light from on high. Paul found this to be the case, for after the light above the brightness of the sun shone upon him while he was traveling the road to Damascus, he turned from trying to do God a service in persecuting the Christians, and became one of the hated, despised Christians himself. Circumstances alter cases. A very good deacon of a very good church in the State of Massachusetts was bitterly opposed to the running of horse-cars on Sunday. He belonged to a church that was forced to fill the aisles with camp-stools during the Sunday services, so popular was the minister; and the church being located so near the business circle, many families were obliged to use the horse-cars in order to reach it. He lived so near it was no trouble for him to walk. Such was his opinion of what constituted sanctity that he verily

believed he was holier than the patrons of the tramway. The time came, however, when he experienced a change of belief in this respect. He got mad with the minister. He couldn't sit under his preaching any longer, so he took a letter to another church, nearer somebody else's house than his own. It was a long distance for the old man who had lived all his life under the eaves of the sanctuary, and the task to walk it was too great. The question to be decided was whether he would forgive the minister and remain in his old church home, or sacrifice his principles and patronize the horse-cars. He settled the matter by patronizing the horse-cars. Now many of these opponents of Sunday trains, claiming to be honest, are in the same position of the good old deacon. They can get mad with the minister, and use the old farm horse to drive to some other church. They can meet in the horse sheds between services and trade horses, sell calves and shoats, buy crops, loan money, retail gossip, and do many things that the patron of the Sunday train would be ashamed to do. Yet this man, for conscience sake, can stop the train from entering Berkshire on Sunday, and subject many to inconvenience and some to loss.

We hope that we have a due regard for Sunday, and the feelings of others, but we must confess that as the world moves today we look upon the running of some trains on Sunday as a necessity, and an act of mercy. We do not make this claim for persons living in the country, as we are of the opinion that they can get along just as well without Sunday trains as with them, and for this reason we are not so anxious to slur them for their opposition. At the same time, we think it would be well for them to know that they are not the only people in the world, and that others have rights just as sacred as theirs. At this season of the year, when milk will not keep sweet two days, it is generally conceded, except by a few very bigoted farmers, that a Sunday milk train is a necessity. There was a time when the Sunday milk train was bitterly opposed, and the argument that thousands of infants in our cities were fed from the bottle, had no effect on these opponents. At last, however, humanitarian feelings triumphed over bigotry, and to-day thousands of infants receive the same sweet nourishment on Sundays as on other days.

The Sunday passenger train has not become so established a fact, as there are still some railroads which do not run trains on Sunday, and there are some communities that try to prevent their running. But let us calmly consider this subject. The country towns feel that they do not need these Sunday trains. But what of the cities?

In our large cities families are hived together, subjected to the heat of the sun from above and the pavements from beneath, and the thousands of fires necessary for household purposes; which add considerably to the heat received from the sun. The family does not experience any difficulty from the foregoing in the winter months, but when summer comes, suffering is their portion. The husband and father goes home at night to find a wife almost prostrated, and children sickly and feverish. He finds a place in the country to which he sends them for pure wholesome food and fresh air. He himself is obliged to remain behind in the city to keep the wheels of business rolling, so that he can earn the money to pay the country people for taking care of his family. Sunday is the only day on which he can visit those who are nearest and dearest to him. Is he to be debarred the privilege of seeing them one day in seven, when he is making so great a sacrifice for their health and comfort? But if there are no Sunday trains he is debarred—what then? He cannot do business on Sunday, and the day becomes to him so lonesome that unless he is a remarkably strong man, he will seek company and recreation in some other way. In a large city these ways are always open, and the best are none too good. A man accustomed to the companionship of wife and daughters, when cut off from them is apt to seek the companionship of other women. There are times and seasons when this is not dangerous, and there are times and seasons when it may be dangerous. Or the man may have such a strict sense of honor as to avoid the above pitfall, and associate himself with men instead. Here he may be safe, but it is so easy to play a game for a little money to add to the excitement, to take a little too much drink, to engage in some questionable pleasure, that he may in time be wrecked. Then there is danger that the wife, away from household cares, may find time hanging heavily on her hands; may make companionships that shall not prove of ultimate good to her peace of mind. In the name of humanity, of law and order, of good morals, of the sanctity of the family, yea of religion itself, the running of Sunday passenger trains can be urged. There is another reason why there should be direct communication between the cities and country towns during the summer months on Sundays, and that is that business men recreating in the country can receive the Sunday papers. There was a time when Sunday papers were not a necessity, but that time is not now. As business is conducted to-day, it becomes every man's duty to keep daily track of movements as they take place throughout the country. A fire Saturday night in some distant city may make a great difference in a man's affairs if known Sunday instead of Monday. When the great fire swept Boston that memorable Saturday night, many men went to the city on Monday morning to find their places of business in ashes and themselves bankrupt. Some of these men if notified on Sunday morning instead of Monday, could have saved something, for many of those who were notified by the telegraph did. A cyclone may destroy crops in some western district—a freshet may delay many trains on as many different railroads—sleet may impair the usefulness of the telegraph—numberless disturbances may occur—earliest possible knowledge of which is essential to the business man. Until men can control the so-called providences of God, or the unaccountable workings of Nature, or the accidents of men, or the knavery of rascals, they must be on the alert every day in the week, Sundays included. There is no law that can work with equal force and justice on all men alike, as different conditions and circumstances call for different lines of action.

There is no excuse in a country town for men to keep their places of business open on any part of the Sabbath day, but there is excuse for such in a city like New York. In a country town the six working days are sufficient to enable all the inhabitants to perform their labors, and provide for their Sunday living. In New York, however, this cannot be done. Thousands of men in this great city work nights. Their pay is so small that it is barely sufficient to provide for one day's living at a time. The money earned Friday night is spent on Saturday for Saturday's living. The money earned Saturday night must be spent on Sunday for Sunday's living, or they must go without. A Sunday law closing up all places of business in a community where this necessity does not prevail, is a blessing and in the right direction. But to make such a law binding on those whose necessities are such as to make the buying of food on the Sunday essential, is to join the company of Pharisees who condemned the disciples of Christ for plucking the corn on the Sabbath to satisfy their hunger. There is no such thing as finally blocking the wheels of progress in any direction; and the running of Sunday trains cannot be condemned when in the interests of humanity, necessity or mercy. The Sabbath was made for man, not man for the Sabbath. We now reach a point where the employés of railroads demand consideration at our hands. We understand that the tramways pay their employés so much a day of so many hours, and pay them only for the days they work. As the tramways run every day in the week the employés work every day and therefore have no Sunday. This is claimed to be a great hardship to the conductors and drivers on the cars. In a certain sense this is the case, but if so disposed could not these employés arrange to have one day in seven if they chose? If we understand it, the reason they do not have it is that they are anxious to make the wages paid for that day. The plea is that $1.75 to $2.00 a day is such small compensation for the number

of hours they work, that they are obliged to work Sundays in order to make a full week's pay. The argument is not good, for if the tramways did not run their cars on Sunday they would not pay the wages for that day; and the employés would be obliged to take six days' pay and be idle the seventh day, which they can arrange to do now if they choose to take six days' pay instead of seven. The fact is, that they value the day's pay more than the day.

Now the running of Sunday trains on our steam railways necessitates the using of men who have already worked six days, and are entitled to the seventh as their own. We make the above statement as a supposable case, for the sake of giving the opponents of Sunday trains every advantage; when in fact we know that some railways give their employés engaged on long travel, every third or fourth day off. Employés on local or way trains may not be served as well, but the strain on them is not so great, as time for rest or recreation is found for them at different times during the day. But allow that the running of Sunday trains imposes on the train hands all the hardships claimed, we ask cannot these hardships be alleviated without stopping the trains? Every sensible railway superintendent can answer this question in the affirmative. Train men can be so detailed that the one set running on Sunday of one week can have the Sunday of the following week. They can also have the one day in seven when they have been on duty on a Sunday by being allowed some other day to take its place. The man who truly wishes to set apart one day as holy unto the Lord can do so as well on one day as on another.

The question of hardship to any class of men is one that we desire to handle tenderly, as we believe it to be a duty to lift all burdens, and have men as free as possible; but in lifting burdens from one set of men we must be careful that by so doing we are not placing heavier burdens on another set. The sailor goes forth to do business on the mighty deep, and sometimes is absent from his loved ones for years. He cannot stop his steamship or vessel in mid-ocean when Sunday comes. If he wishes to keep the Sabbath, he must do so on shipboard under such circumstances as surround him. If it is a calm he can sit around, read his Bible and pray. If it is a stormy day, he must man the ropes instead. But whether the day is calm or stormy, if he is a religious man he is as near God in one case as the other. Now there is no railroad man who will claim that his hardship is as great as the sailor's. The truth of the whole matter is this, that in the question of hardship, every man is liable to think his own burden greater than his neighbor's, and yet when acquainted with his neighbor's he has no desire to exchange.

We must try to help each other in the bearing of our burdens, not by transferring them from one set of shoulders to another, but by making a more equal division of labor. While Sunday trains are a necessity and will be run, train hands, so far as they wish it, can be given one day in seven. If they prefer to earn the money for this seventh day instead of taking the day itself, there is no need of philanthropists espousing their cause by decrying the running of Sunday trains.

In the case of the railway companies as corporations, some legislation may be necessary to guide them in the running of these Sunday trains, and yet we do not now see how such legislation can avail much. As we review the situation, we judge it to be better to let public opinion bear upon each road, and demand the running of such trains as are necessary, and the suppression of such trains as are unnecessary.

Railways running from large cities to neighboring health or pleasure resorts, are obliged to run trains more frequently to accommodate the great multitude, to whom Sunday is the only day of recreation, than is necessary on railways running from cities to country homes. The latter may succeed in accomplishing the end desired by running one train each way on a Sunday, while the former can only accomplish the end by running as many trains as the travel demands.

We have tried to present this subject to our readers in the most kindly spirit, intending to deal fairly with both sides, and now ask in conclusion that the defendants and opponents of Sunday trains bear as kindly with each other, remembering that each party has rights the other is bound to respect.

THE RAILWAY EXPOSITION.

WE publish in another column some excerpts from Journals regarding this Exposition. Our readers will have noticed that while we have been careful not to condemn the Exposition in the past, we have avoided the giving of undue praise. The ground occupied by us was taken, not from any lack of faith in the honesty of the managers, but from a fear that the Exposition might assume too great proportions for the simple business management advertised in the beginning. From what we learn from our special correspondent on the field, we conclude that we were right in our surmise. The Exposition had hardly closed the doors before the cry of fraud was heard. Some claimed that the whole thing was gotten up as an advertising dodge of a rival Railway Journal. But suppose it was, what then? If the President and Editor of the *Railway Age*, or any other paper, is smart enough to engineer a grand affair like the Railway Exposition successfully, he deserves great credit for his enterprise and ability, and ought to receive liberal compensation. If he looks for his compensation in a more extended patronage to his paper, we sincerely hope he will not be disappointed. We understand that the Exposition itself will show a deficit of about ten thousand dollars, which we trust will be promptly made up, so that those who have done the work will not suffer loss. But there is another charge of fraud, and that is that the Awards and Medals were not awarded according to the merit of the articles exhibited. We are afraid that the accusers are a little too hasty in making such a charge. In the printed rules and regulations governing the Exposition, we find the following:

RULE VI.

Section 1 Committees of awards, or juries, for the several classes, will be announced to exhibitors in due time, the desire of the Commissioners being to organize them with great care, from persons entirely disinterested, and yet qualified by education and experience to serve intelligently and satisfactorily. Exhibitors or their representatives in attendance will be notified of the date of examination of their exhibits in advance of such examination.

Section 2. The jury for each class will consist of three persons, and awards will be based upon examinations and tests in the most thorough possible manner.

Section 3. *Juries will award medals only to the most meritorious exhibits in each class*, and where but one exhibit is entered in any class, no award will be made, unless in the unanimous opinion of the jury, approved by the commissioners, it is worthy of award, notwithstanding the absence of competing exhibits, and they may refuse to award a prize in any case where the article falls below a proper and reasonable standard of excellence.

The careful reader will notice that Section 3 of Rule VI., expressly states that "Juries will award medals ONLY TO THE MOST MERITORIOUS EXHIBITS in each class. The framer of that section may have had in mind that he and his associates did not care to bear the whole expense of the Exposition, and the best way to avoid this was, to make it an object for an exhibitor to take as much space as he could. There was one way to do this, and that was to award a medal to the most meritorious exhibit. The exhibitor having money and not the best article to exhibit,

could fit up a booth at great expense, and outshine his poorer competitor even though he had a better article. He would get the medal for his exhibit, and the majority of people on this account would think his article the best when, in fact, it was inferior to his poorer neighbor's. Now there are many manufacturers who would gladly take advantage of such a rule and spend large sums of money on their exhibit, and in getting the medal would consider themselves well repaid for their outlay. The managers making such a rule would be glad of such an exhibit, for the more attractive the exhibits, the greater drawing power the Exposition has for the crowd.

Now so far as this goes there is no fraud as between the manager and the exhibitors. The fraud, if any, is between them both and the public. No manufacturer was obliged to enter his goods, and if he did enter them, he was not obliged to compete for a medal. We are surprised that so many manufacturers claiming to be high-toned, entered into competition for a medal under such a rule.

Another charge of fraud is, that the medals in the different classes were awarded from favoritism and not according to rule. This is an old stereotyped charge made at the final of all such Expositions, and as we can never get at the right and wrong of it, we do not propose to waste time discussing it.

There is still one other charge of fraud and that is that in some cases the medals were not awarded. This result is claimed to have been forced on the managers by the action of exhibitors before the Jury appointed to decide on the merit of exhibits. Now there can be no question but that one exhibit was better than the rest, and that that exhibit earned the medal. Why is not the medal awarded? If one party fits up a booth at an expense of $10,000, another at $8,000, another at $6,000, another at $4,000, it is a very easy matter to decide that the $10,000 booth is the best exhibit and entitled to the medal. But if the $4,000 booth has the best goods, such a decision is a palpable fraud on the public. Then why not award the medal to the $4,000 booth because of superior goods? This cannot be done, as such a decision would be a fraud on the $10,000 booth. What can then be done? Simply what has been done, award no medal at all, and this is fraud. We have written the above not in any condemnatory spirit, but with the desire to put future managers on their guard.

THE TRADE DOLLAR.

SOME years ago, the government of the United States issued a coin which is known as the trade dollar. We have always understood that its intrinsic value was greater than that of the dollar of our fathers, and that it was made of such a value so as to be used for trading purposes with China.

To-day there is quite an excitement in New York, and perhaps elsewhere, regarding this trade dollar, and many are refusing to accept the coin except at a depreciation of fifteen per cent. The dollar of our fathers, which has been acknowledged to be of less value as bullion, is readily taken for its face value of one hundred cents. This difference between the two coins in the minds of the people is occasioned by a very small thing, the fact that the United States government has declared one to be legal tender and the other not. This action of the government in declaring the trade dollar to be not a legal tender, virtually makes millions of dollars of money in the United States absolutely useless for all business purposes. From a business standpoint, the United States government has been guilty of issuing and circulating millions of dollars of silver coin, which is worthless only as a party is willing to stand the shrinkage and have the same melted into bullion. All of these trade dollars came out of the United States Treasury, but not one of them can go back again, as the treasury will not accept it.

The face of each one of these trade dollars bears the imprint of the United States government that issued it, and yet at any post office of this government you cannot use one to buy a postage stamp with. It is a well-known fact among those who have been obliged to accept trade dollars, that for a long time back they have been unable to deposit them at the Banks or use them on railroads or steamboats. The only apparent use they have subserved is to enable skin-flint employers to buy them at eighty-six cents each and pay them to their employés for services rendered at 100 cents apiece. The employés have managed to pass them in payment for the necessaries of life, and if the storekeepers have not charged enough profit to protect them against loss, it is because they expected to pass them to any customer who needed change for a five-dollar bill. To-day, so far as New York is concerned, the bubble has burst. Hereafter, trade dollars will not be accepted by leading dealers, and all employés as well as their employers, must protect themselves by rejecting the worthless coin. We now hope that the United States government will take some action toward redeeming the coin that bears her imprint.

THE statement is made that W. J. MURPHY, Superintendent of the Delaware division of the New York, Lake Erie and Western Railroad, has issued an order prohibiting his men from taking alcoholic liquors, either while on or off duty. This is going a step beyond the prohibition of their use of such drinks while engaged in the performance of their work. There can be no question that if Mr. MURPHY's prohibition be obeyed in good faith, the safety of passengers traveling on his division will be promoted.

WE notice with pleasure that the public press continues to discuss the subject of a better future for American boys, whose opportunities of learning useful trades are unhappily very imperfect. The Chicago *Tribune*, in making out a good case for industrial education, has this to say as to its effects in the direction of providing means for native-born boys to acquire a knowledge of mechanical handicrafts: "If anything would excuse a sordid and determined banding together of Americans to crush out this foreign labor Know-Nothingism, it would be this monstrous injustice practiced upon American boys. Every boy who desires to learn a trade has the right to learn it, and no contingency or emergency of trades unionism can suggest even the shadow of an apology for preventing him. The manual training school, which will thoroughly equip every boy who goes to it with the knowledge of the trade he wishes to learn, is the agency which is bound to defeat the selfish and unjust schemes of trades unionism to monopolize labor, and keep it in its hands by keep-

ing American boys out of it. The faster these schools are multiplied the stronger will be their blows at this foreign conspiracy."

MR. BURNHAM, of Philadelphia, started a library fund, the product of which is a well-selected stock of books, used by the employés of the Denver and Rio Grande shops, located at Burnham, and a handsome balance in the treasury of the library association. We mention these interesting particulars in the hope that they will provoke men with the necessary means and influence to imitate Mr. BURNHAM'S example. The leaders in railroad enterprise could hardly do themselves and the public a better service than by encouraging the many men in their employment to spend their hours of recreation in useful reading; and the advantage to the employés would certainly prove incalculable. Many a good fellow wastes his time in reckless dissipation, from the sheer absence of inducements to the profitable use of his leisure. The provision of these would prove the beginning of advancement to young men who possess the natural capacity for great usefulness, but who, at present, are denied opportunities of improvement by their superiors in station and fortune.

ONE of the most interesting of the international exhibitions of this year, is that of Venezuela, which will be opened at Caracas, the capital of that country, on the twenty-fourth instant. This date will be the hundredth anniversary of the birth of SIMON BOLIVAR, who was born in Caracas, which city will give itself up to patriotic gayeties on the date named. Not only will the doors of the exposition be thrown open to the public on that day, but a statue of GEORGE WASHINGTON will be then unveiled, and what is still more interesting to the readers of this JOURNAL, a railroad running between Caracas and La Guayra, its port, will be put in operation. Our kindest wishes attend the events announced.

RAILROAD BUILDERS AS PUBLIC BENEFACTORS.

IT is a suggestive commentary upon the little wisdom with which mankind is governed, even in a free republic, to note that the railroad corporations, and indeed every other private association for conducting internal improvements and transportation, are regarded by the political power as things to be watched, guarded and restrained as if they were enemies of the public weal. There can be no doubt but that at the bottom this feeling originates in a form of jealousy. The political organization is not of that compact homogeneous character, nor is it bound together by such ties of fidelity or zeal as are religious, philanthropic, or purely commercial bodies. The element of patriotism forms but a small proportion, while the element of self-seeking vanity and grasping avarice forms a large part. The public service is not conducted with the same diligence, economy and efficiency which characterize any other considerable branch of industry. One moving principle animates all political parties—the cohesive power of the hope of public plunder. Self-seeking is indeed at the bottom of commerce, of ecclesiastical and professional ambition; but it is also true that while railroad builders and managers combine to increase their accumulations, or to make safer their possessions, they cannot do this without at the same time greatly benefiting the public. No other organization short of that which we call the nation, has contributed or can contribute to the whole people anything like the amount of benefit conferred by the steam transportation of the present age. Had the law remained in this country as it has in some semi-civilized countries, so as not to favor associated effort, transportation must have been carried on by individuals, or by the government. Had the railroads been undertaken by the government, it is safe to say no such extent would have been built to-day, and the cost would have been many times that which has been incurred. Take, as an illustration, the original Pacific Railroad. Notwithstanding the reckless haste and extravagant expenditure encouraged by the race of the two companies across the continent to a meeting point seven years sooner than the specified time, it is still cheaper than the government could have done the same work. It may be doubted whether the road between the Missouri River and the Pacific Ocean would have been completed to-day, had it been conducted by public officers; and there is no doubt that the cost would have been more than double.

On the other hand, observe the intolerable slowness of improvements to the rivers and harbors. When an imperative necessity arises, like that at the mouth of the Mississippi River, even now it becomes necessary to let the work out by contract to private individuals, and the work is soon done. There are half a dozen harbors of great importance, Mobile, Sabine, Galveston, Portland, San Pedro and Aransas, which could be cleaned out in much the same way if Congress could be persuaded to make them the subject of private contract. Yet the political power, from motives which must be guessed, prefers to hold these great improvements back, rather than exhibit its own inefficiency in such matters. Had it been possible to let out the contract for the suppression of the rebellion, no one doubts that it would have been finished up much sooner and at much less cost. But because sovereign power must of necessity be lodged with the political organization by which the nationality is embodied, it does not therefore follow that it should undertake other functions for which it has neither the adaptation nor the inspiring impulse. The authority of the government over its members may, and for some purposes must, be absolute; but that is no reason why it should undertake to exercise absolute authority in matters which are not strictly governmental functions.

The fashion of our day is for every State to create a railroad commission, for the avowed purpose of exercising some supervision or regulation over the railroads and their business. The sole ground for this interference is because railroad companies are managed and worked by corporations and not by individuals. In other words, political power shows an unworthy jealousy of the efficiency and beneficence of private effort; and in order to magnify its own importance it is necessary to make out that the people are suffering from some grievance, which nothing less than the interposition of the sovereign power can remove. These commissions have various powers and attributes; some of them, like those in Massachusetts and Ohio as examples, being little more than compiling and reporting bodies; others, like

commissions in Georgia, Tennessee and California, have been invested with the authority to prescribe rates of fare and freight, and the issue remains to be decided whether such an interference with so delicate a matter as transportation will be carried to its logical extreme. In the ever-shifting platforms of political parties, there will always be the demagogue who will seek to convince the mass of voters that they are oppressed and abused, who is ever willing to be the communistic agitator to persuade the people that their condition can be improved by a statute, and that by his help they may be made to exchange places with their rich neighbors. Such an effort is now made to embody in the platforms of both the great parties of this country, planks aimed at railroad corporations; and to do this it is necessary to falsify and circulate falsehoods on the whole subject of transportation, in the hope of convincing the working people that somehow their earnings are disappearing into the pockets of the railroad owners.

It is time that this should be looked at from the other side. Railroad builders, as a class, do not claim any great credit for unselfishness, nor for sacrifice for the public benefit; but all the same it remains true, that more than any other class they contribute to the general welfare and prosperity. The hue and cry may be raised in Congress about the enormous expanse of land granted for the benefit of railroad corporations; but the agitators will be careful to conceal the fact that one-half of the land reserved by the government in making these grants, is worth more with the railroads built, than the whole was without them, to say nothing of the immeasurable addition to safety and general convenience for military and other purposes. Efforts may also be made to get Congress to undertake the task of prescribing rates, or limitations upon charges for railroad service. All this would be very absurd, and could only lead to greater evils than those already proposed to be suppressed. Statistics show that the cost of transportation is growing less year by year; and that at the present time the provisions necessary to support a laborer in Massachusetts for six months, may be transported from the Upper Mississippi River for the equivalent of two days' labor. Such a thing a century ago would have been counted miraculous; and yet the clamor is greater to-day for some sort of blind arbitrary action in the Legislature than at any former period. It is difficult to account for this upon any other theory than the one which admits the fact that the talent, integrity and diligence of the country has gradually drifted into commercial channels, of which transportation may be said to be the concentrated expression. In former times, these were wont to be absorbed into the army and navy—the fighting professions. The lazy and indifferent part of a population, which seeks to obtain a living from the more industrious portion, naturally drifts into politics and into public office-holding. Here is cause enough for jealousy, and it is not a new thing, for jealousy between the same classes, the thrifty and the thriftless, has existed as far back as we have any recorded history of organized government. It requires no prophetic gift to foresee the result of a contest between such powers. The politicians will give way. They are overmatched, although they seek to ally with them, especially, the farmers and manual laborers. That part of their motive which is not born of jealousy is born of a baser passion, envious greed; and such defects may be expected to lead their avarice to get the better of their judgment, and surrender as they usually do to the purse-holders.

So eager and grasping is the pursuit of wealth in this part of the world, and in this age, that the winners in the race of accumulation, like those who participate in other contests, get more than their share of attention, and their value to the community is apt to be rated by the length of their purses. The ambition of young men is fired by the spectacle of great wealth; but this is merely an extreme development of a useful trait. The passion for accumulation is one which distinguishes the progressive from the non-progressive races of the earth. Here and there an excess or an unbalanced mind is led to downright dishonesty in order to get hold of wealth; but in general the example is beneficent, and if it results that the railroad builders and managers of the country gather more wealth, or accumulate it more rapidly than the other classes, it is not so much because they are railroad men, as because they have the penetration to see in the great game of competition where the fortunes are most likely to be made. In old times land-holding was the great source of wealth until, as in old countries, the competition became so keen that the income from landed estates was reduced to about three per cent. per annum, or even less. There were land barons in old days, but their power has been shorn by one another. There are railroad kings in our days, but the excessive competition which they are sure to meet, and not legislative restrictions, will diminish the chances in that field. Mr. VANDERBILT, or Mr. GOULD are pushing out new lines or perfecting old ones; and although they may not be conscious of it, are really doing a favor to the whole community. In a similar manner, Mr. HUNTINGTON and Mr. DILLON, by pushing out lines across the new and unsettled country, are accomplishing a veritable missionary work. The same men, and others with them—Mr. NICKERSON and Mr. PALMER, for instance—who are now pushing lines into the neighboring Republic of Mexico are, consciously or unconsciously, potent factors in civilizing and redeeming that portion of the world; and doing a more effective work than all the churches which exist there, or all the ecclesiastical missions ever opened. The railroad track not only disperses the troublesome red Indian, but also introduces the light of the highest civilization. The same thing may be said of the Southern States, and particularly of the great empire of Texas, which has been lifted forward in development and in all the elements of a better society half a century by the introduction among them of railroads, steam engines and all the accessories of modern transportation.

GREAT BRITAIN owns about twelve hundred and fifty million dollars' worth of ships engaged in carrying merchandise; the United States about one hundred and fifty million dollars' worth. A contemporary suggests that the disproportion in these figures could possibly be relieved in our favor, and that we could take advantage of the circumstance, that British interests suffer from the mischievous competition of cheaply-built and cheaply-run steamers. We do not see how these, to us desirable things could be done, excepting that arrangements were made by which United States steamships could compete at rates lower than those charged by the cheapest British vessels. Large subsidies

would be necessary to make such competition practicable, a further innovation upon the general principle, so generally accepted as incontrovertible by the great masters of political economy, that trade is best left to take care of itself.

Chicago and Atlantic Railway.

CHICAGO, June 23, 1883.

AMERICAN RAILROAD JOURNAL:—Upon his arrival in Chicago, a formal invitation was extended your representative, as follows: "The pleasure of your company is requested on Saturday, June 16, at the inauguration of the New Through Line of the Chicago and Atlantic Railway, etc., etc. S. W. Snow, General Passenger Agent." In company with an official of the Chicago and Atlantic Railway, I reached the Polk street depot at three P. M., and entered the train, composed of the finest cars of the Pullman pattern, a counterpart of the exhibit made at the Exposition of the cars to compose the through trains to the East, via the Chicago and Atlantic Railway. If space allowed, I would detail the unique and attractive features of these elegant trains. But the traveling public are familiar, before this, with the details, both by description and the travelers' test—use. I will quote some head-lines of an enthusiastic contemporary: "Gilt-edged," "A model of perfection, stability, comfort and splendor combined," as applied to the cars, the route, and management of the Erie's new acquisition. Each car is externally alike in decoration, and each bears the sign, "New York and Chicago Through Line via Erie Railway." The coaches were built by Pullman—the best that could be produced by that well-known interest. The wheels used are the Allen Paper Wheel, forty-two inches diameter, the largest in use by any road. The painting and decorations, interior and exterior, are with materials furnished by F. W. Devoe & Co. Brass trimmings are furnished by the Union Brass Manufacturing Co. The heating will be furnished by the Searle Hot Water Heater Co. The seats and springs are furnished by Z. Cobb & Son. The cars are splendidly illuminated by the new system of the Pintsch Lighting Co., of 19 William street, New York. The trains are drawn by the best of Brooks' Locomotives. Certain it is, that the enthusiastic sentence I copy from a circular of Colonel Snow, that "in equipment, the Chicago and Atlantic will not be excelled, if equaled, by any other road in the world," is the result aimed at by the management. The route is: from Chicago to Marion, Ohio, 143 miles; thence by the New York, Pennsylvania and Ohio, to Salamanca; and thence by the Erie to New York.

It is needless, perhaps, to say that the opening festivities during our trip of forty-nine miles and return, and the banquet, etc., during our stay off train at Boone Grove *en route*, were occasions of good feeling, enjoyed by the several hundred railroad men, newspaper attachés, and others who composed the party.

E.

A Becoming Death.

WITH No. 8, Vol. I, dated June 26, 1883, *The Patent Office News*, Washington, D. C., expired. Its last dying words are quotable because of their spirit and the moral they convey. They are as follows:

"In its initial number *The Patent Office News* announced that it had 'come to stay, if the class it was designed to serve wanted it to stay,' adding that it was 'not a philanthropic venture.' It has become evident that the class *The Patent Office News* was designed to serve do not care whether it stays or not. Many thousand copies have been distributed among inventors and manufacturers, as well as patent attorneys at home and abroad. The returns do not appear to us to justify a continuation of the publication, and with this number *The Patent Office News* ceases to exist. Patent attorneys and manufacturers have given us many kind words of encouragement, but it has not been found necessary to station a policeman at the door to preserve order in the procession of gentlemen crowding in to subscribe and advertise. Neither have the mail-carriers grown stoop-shouldered under the burden of postal orders, checks, and greenbacks sent in from the four corners of the earth. In brief, the venture has not proved so successful as was anticipated, and we propose to discontinue now rather than drag along to a more painful death further on. To those who have shown a disposition to help the infant enterprise along we return our hearty thanks, coupled with the wish that we could have given them more for their money."

LITERARY NOTES.

THE quarterly issue of *Bullion* is proving a hit. It exactly meets the convenience of those needing a current reference manual of our transportation interests, railroads, telegraphs and shipping, together. These form practically one system, so far as service is concerned, and in fact so far as intelligent dealings in any of their securities is concerned.

CINCINNATI as an industrial center is ably represented by *The Artisan*, published in that city, the June number of which comes to us in a larger and handier form, decidedly a pleasanter if not better informed visitor, than preceding issues, its every page possessing a winning, open countenance. We find its original contents good and interesting, and the selections made with the judgment of a well-practiced editor.

OF the various interesting matter contained in a pamphlet on Taylor's American Portland Cement, published by Johnson & Wilson, of No. 91 Liberty street, this city, and just received, we can only find room to say that the material indicated has been used with gratifying results and increasing sales, since 1875. Messrs. Johnson & Wilson now own facilities for the production of five thousand barrels of cement a month, and their product is found to be at least equal to imported Portland cement. The interesting pamphlet before us establishes this fact, among other ways, by the reproduction of a history of the jetties at the mouth of the Mississippi River, written by E. L. Corthell, C. E., chief assistant and resident engineer during their construction. We unhesitatingly advise all who use Portland cement to procure and read the interesting pages under review.

AMONG our most valued exchanges is *The Times-Democrat*, of New Orleans. This admirable newspaper is very readable and well-informed every day of the week, and its Sunday issue, usually a much larger production than the paper is on other days, fills the place of a live weekly magazine in the households doing themselves the service to take it. The correspondence of the *Times-Democrat* is useful, racy and comprehensive, representing all the principal centers of business and society, throughout the United States. In literary ability, the amount and variety of information contained in its columns, and acceptability as a wide-awake and enterprising newspaper, the *Times-Democrat*, of New Orleans, is very superior; and the interest with which we regard it is heightened by its peculiarities as a Southern newspaper, published in far-away Louisiana.

THE illustrated price list of Riehlé Brothers' Standard Scales and Trucks and their Testing Machine catalogue embody a large amount of useful information presented in an attractive form. Both are procurable by application to the Philadelphia Scale and Testing Machine Works. These works were established as long ago as 1846, and the superiority of the machinery made in them admits of no question and needs no mention. We observe that the Riehlé Brothers' Testing Machines are used by the United States Government and by many leading manufacturers both on this continent and in Europe.

A NEWPORT (R. I.) newspaper lately proposed a new plan for the reformation of prison discipline—that prisoners should be paid for the labor which they perform, taught by experience the true value of liberty, and be given a practical experience of the value to the individual of harmonious society. The subject is dealt with interestingly, and with strength and good feeling in the July number of the *Century Magazine*.

RAILROAD EARNINGS—MONTHLY.

B., C. Rap. & N.:	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1881	167,750	124,510	148,551	184,680	165,630	205,912	174,351	209,112	221,801	221,748	202,180	232,812	2,259,037
1882	252,823	225,631	224,107	178,304	199,278	186,143	198,276	224,921	261,439	300,155	278,439	246,062	2,800,679
1883	197,402	187,001	252,913	218,253	208,671	217,574	.....	.....	.....	.....	.....	.....	.....
Central Pacific:													
1881	1,602,907	1,454,218	1,709,638	1,872,370	2,091,411	2,159,382	1,899,346	2,088,519	2,185,303	2,507,857	2,297,971	2,225,179	24,094,101
1882	1,839,469	1,720,675	1,969,737	2,054,687	2,342,298	2,229,105	2,076,648	2,350,557	2,495,445	2,424,529	2,139,259	2,020,349	25,662,757
1883	1,718,000	1,424,000	2,021,000	2,035,000	2,099,000	.....	.....	.....	.....	.....	.....	.....	.....
Chesapeake and Ohio:													
1881	162,540	184,389	228,479	227,343	252,235	241,135	225,096	262,858	247,144	236,396	230,022	203,562	2,702,762
1882	208,746	179,053	215,445	267,454	257,040	271,381	306,831	371,175	332,219	347,882	287,850	.....	.....
1883	244,142	250,287	270,676	279,659	331,173	326,525	.....	.....	.....	.....	.....	.....	.....
Chicago and Alton:													
1881	499,120	474,318	529,915	558,190	548,555	635,860	676,205	769,751	774,790	771,844	672,380	646,812	7,557,740
1882	585,830	517,897	588,700	564,861	559,577	617,250	702,635	856,398	912,692	858,674	749,915	701,066	8,215,495
1883	637,894	538,537	671,576	584,981	630,097	653,539	.....	.....	.....	.....	.....	.....	.....
Chicago and Northwestern:													
1881	1,240,664	963,204	1,178,795	1,474,612	1,879,006	2,306,440	1,983,032	2,315,164	2,292,676	2,341,098	2,019,038	1,855,477	21,849,209
1882	1 644,935	1,474,176	1,672,931	1,668,741	2,110,947	2,043,516	2,025,736	2,099,755	2,497,053	2,592,100	2,069,287	1,718,379	23,828,973
1883	1,362,704	1,264,907	2,059,700	1,742,900	2,122,698	2,175,528	.....	.....	.....	.....	.....	.....	.....
Chicago, Burlington and Quincy:													
1881	1,307,948	1,034,821	1,418,149	1,574,371	1,679,455	2,083,803	1,888,358	2,173,945	2,262,981	2,031,001	1,816,133	1,905,490	21,176,455
1882	1 658,834	1,457,300	1,566,217	1,530,838	1,505,261	1,437.164	1,625,006	2,086,858	2,186,400	2,270,444	2,199,421	2,027,060	22,550,804
1883	1,625,680	1,611,021	2,396,583	1,824,130	2,009,872	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, Milwaukee and St. Paul:													
1881	990,848	682,718	916,990	1,259,946	1,538,491	1,729,812	1,568,706	1,678,361	1,644,67c	1,591,053	1,569.598	1,854 269	17,025,462
1882	1,434,537	1,376,377	1,561,386	1,517,569	1,627,932	1,619,431	1,464,927	1,545,199	1,950,710	2,250,975	2,072,973	1,964,709	20,386,726
1883	1,359,000	1,258,000	2,044,000	1,972,000	2,034,000	2,023,000	.....	.....	.....	.....	.....	.....	.....
Chicago, St. Paul, Minneapolis and Omaha:													
1881	257,786	158,594	251,648	261,211	350,124	404,562	383,202	385,586	373,370	.379,029	592,921	432,615	3.981,296
1882	327,498	333,200	413,200	377,288	402,882	374,694	331,480	394,555	482,997	.546,671	317,595	375,796	4,973,052
1883	302,700	277,900	415,800	419,535	446,746	428,934	.....	.....	.....	.....	.....	.....	.....
Denver and Rio Grande:													
1881	307,476	317,681	398,493	433,111	514,767	584,230	548,284	606,193	589,287	638,432	547,055	626,728	5,980,488
1882	488,599	407,000	521,500	556,917	606,400	531,700	495,797	574,040	595,306	630,598	512,965	443,000	6,349,857
1883	418,300	433,400	521,600	573,700	631,900	639,600	.....	.....	.....	.....	.....	.....	.....
Hannibal and St. Joseph:													
1881	154,401	122,874	176.356	190,812	172,950	190,740	201,899	210,240	215,103	231,913	195,607	194,336	2,230,961
1882	125.601	152,691	185.368	158,113	165,630	147,526	184,609	254,569	239,732	238,563	249 252	239,891	2,303,388
1883	179,591	180,887	228,410	193,481	194,394	.....	.....	.....	.....	.....	.....	.....	.....
Illinois Central:													
1881	631,281	524,499	557,789	662,493	673,259	803,887	720,004	868,407	828,847	815,238	737 218	763,475	8,586,397
1882	1,019,453	987,998	995.474	887,543	891,328	858,861	752,251	813,600	828,238	865,325	752,144	697,051	8,831,281
1883	1,058,620	931,971	1,106,658	888,431	947,216	935,108	.....	.....	.....	.....	.....	.....	.....
Indiana, Bloomington and Western:													
1881	90,283	83,261	192,085	203,677	200,064	199,846	199,125	272,114	247,932	225,678	200,450	192,622	2,487,569
1882	195,824	175,755	204,538	205,934	182,554	186,133	206,072	278,814	273,100	269,046	256,998	205,212	2,641,675
1883	248,142	202,931	268,801	215,912	234,151	.....	.....	.....	.....	.....	.....	.....	.....
Louisville and Nashville:													
1881	812,118	805,124	947,959	855,704	828,726	1,227,885	817,135	876,192	951,566	1,002,950	1,065,223	1,153,779	11,344,361
1882	964,527	960,315	1,068,834	953,603	958,130	1,215,490	1,063,765	1,043,912	1,114,513	1,215,932	1,192,390	1,221,509	12,981,432
1883	1,118,735	1,015,000	1,141,337	941,129	1,050,615	.....	.....	.....	.....	.....	.....	.....	.....
Mobile and Ohio:													
1881	224,347	216,768	230,916	163,551	145,803	136,517	135,546	160,789	210,262	256,924	262,986	258,812	2,403,224
1882	159,676	158,590	148,166	141,957	134,378	136,184	135,174	137,475	157,874	267,433	295,110	307,643	2,179,666
1883	216,608	172,200	180,113	128,462	143,294	124,640	.....	.....	.....	.....	.....	.....	.....
Nashville, Chattanooga and St. Louis:													
1881	178,143	190,866	207,710	183,525	104,430	154,549	150,430	168.317	179,979	172,121	152,059	173,127	2,075,258
1882	170,753	174,974	177.336	167,393	154,163	119,074	160,991	168,304	168,999	180,319	181,336	186,352	1,933,047
1883	197,388	195,262	206,164	161,435	171,079	.....	.....	.....	.....	.....	.....	.....	.....
New York and New England:													
1881	189,749	173,614	212,019	216,913	217,185	231,518	246,821	280,524	299,573	261,20c	240,764	240,063	2,809,255
1882	213,840	217,261	265,222	261,044	289,722	285,392	298,441	346,490	338,347	310,145	276,183	261,082	3,408,169
1883	258,266	231,741	284,869	268,853	290,951	293,919	.....	.....	.....	.....	.....	.....	.....
New York, Lake Erie and Western:													
1880	1,296,381	1,252,218	1,644,958	1,643,151	1,592,544	1,661,812	1,580,976	1,606,874	1,786,417	1,899,910	1,799,338	1,726,788	19,149,361
1881	1,443,437	1,425,765	1,847,261	1,709,057	1,776,891	1,794,982	1,787,081	1,772,895	1,734,200	1,814,866	1,715,469	1,571,208	20,393,112
1882	1,318,997	1,304,757	1,567,632	1,670,749	.....	.....	.....	.....	.....	1,819,010	1,818,824	1,691,404	20,203,469
1883	1,524,869	1,283,616	1,696,969	1,548,474	.....	.....	.....	.....	.....	.....	.....	.....	.....
Northern Central:													
1881	386,157	382,657	452,906	487,273	465,588	487,287	440,811	498,008	429,565	449,664	487,160	476,622	5.443,697
1882	407,368	413,551	414,789	420,490	465,694	482,752	509,683	667,488	592,435	550,225	526,685	490,003	5,800,176
1883	499,252	486,865	506,864	476,335	499,133	.....	.....	.....	.....	.....	.....	.....	.....
Northern Pacific:													
1881	116,508	78,803	162,984	216,210	312,705	412,024	393,260	434,085	534,363	583,c55	475,610	439,724	4,044,576
1882	245,369	268,935	373,141	451,023	616,231	704,617	694,067	727,215	772,838	829,831	761,324	564,749	7,009,344
1883	392,035	373,091	583,400	675,200	775,600	.....	.....	.....	.....	.....	.....	.....	.....
Philadelphia and Erie:													
1881	224,303	225,501	285,573	293,323	343,792	350,585	291,669	303,849	276,522	292,392	284,078	282,772	3.454,309
1882	252,727	246,246	265,311	277,851	341,415	347,614	377,206	20,3204	386,455	397,164	369,583	335,513	4,011,413
1883	319,720	295,638	308,069	311,636	363,359	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis and San Francisco:													
1881	212,435	178,234	262,050	265,298	283,399	260,254	252,333	286,373	279,064	308,569	284,320	287,914	3,160,245
1882	256,784	244,654	274,959	242,806	253,419	241,200	318,613	381,637	336,805	360,900	331,490	339,424	3,582,811
1883	278,321	236,278	351,689	274,011	296,756	259,800	.....	.....	.....	.....	.....	.....	.....
St. Louis, Alton and Terre Haute:													
1881	175,725	166,012	201,137	197,447	172,177	165,896	165,393	189,180	196,368	204,338	169,795	171,127	2,112,801
1882	168,987	149,619	177,609	165,401	162,842	142,742	192,017	236,137	217,659	229,962	206,040	184,526	2,245,320
1883	193,614	177,717	204,762	160,805	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Iron Mountain and Southern:													
1881	570,957	560,791	704,002	548,300	479,075	474,302	533,512	644,386	708,325	719,239	687,271	709 498	7,319,744
1882	516,370	501,127	585,008	581,977	519,120	529,700	515,519	675,981	724,160	809,394	843,973	781,305	7,581,635
1883	665,258	522,781	632,228	.....	558,788	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul, Minneapolis and Manitoba:													
1881	254,187	159,482	320,962	425,685	382,642	405,322	387,488	414,954	485,736	605,708	508,530	528,262	4,878,960
1882	395,461	418 358	531,071	570,890	858,902	856,417	853,296	801,759	832,776	979,057	913,335	753,515	8,764,770
1883	489,763	389,612	729,844	812,008	727,499	.....	.....	.....	.....	.....	.....	.....	.....
Texas and Pacific:													
1881	281,176	260,781	319,928	295,066	281,782	285,405	328,063	381,331	345,790	419,203	369,521	401,058	3,921,569
1882	323,987	278,535	343,442	359,543	421,219	384,713	367,215	439,918	470,613	541,901	619,655	641,044	5,143,179
1883	534,529	416,040	526,901	.....	496,278	.....	.....	.....	.....	.....	.....	.....	.....
Union Pacific Railway:													
1881	1,339,799	1,374,740	1,674,860	1,766,894	2,319,238	2,884,774	2,528,826	2,638,659	2,844.357	3,169,530	2,723,608	2,267,004	29,776,899
1882	2,186,020	1,835,620	2,392,593	2,369,609	2,491,590	2,508,453	2,301,000	2,762,107	2,949,112	3,158,337	2,821,070	2,294,000	30,088,109
1883	1,986,535	1,743,207	2,489,405	2,435,844	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wabash, St. Louis and Pacific:													
1881	865,339	813,374	1,109,399	967,033	1,148,669	1,330,944	1,120,615	1,542,124	1,497,246	1,406,029	1,372,360	1,294,657	14,467,790
1882	1,229,065	1,134,768	1,313,776	1,378.191	1,204,864	1,149,632	1,418,837	1,772,544	1,682,382	1,595,680	1,525,715	1,331,952	16,738,360
1883	1,307,783	1,070,758	1,479,236	.....	1,213,946	.....	.....	.....	.....	.....	.....	.....	.....

RAILROAD, TRAMWAY AND CANAL DIVIDEND STATEMENT.

Showing the amount of Stock Outstanding, the Dividend Periods and the date of last Dividend.

Marked thus (*) are leased roads.	Stock out-standing.	Divide'd Periods.	Last Dividend Payable.
Albany and Susquehanna*.....100	3 500,000	semi-an	July 1, '83 2
Atchison, Topeka and Santa Fe.....100	56,932,200	q'arterly	Aug. 15, '83 1½
Atlanta and Charlotte Air Line 100	1,700,000	semi-an	Mar. 5, '83 2
Atlanta and West Point.....100	1,232,200	semi-an	Aug. 1, '83 3
Atlantic and St. Lawrence*.....100	5,484,000	semi-an	Mar. 15, '83 3½
Augusta and Savannah.....100	1,032,200	semi-an	Dec. 4, '82 3¾
Baltimore & Hanover.....100	85,805	.....	Apl. 9, '83 3
Baltimore and Ohio.....100	14,792,566	semi-an	May 1, '83 5
" " pref.....100	5,000,000	semi-an	July 1, '83 3
Washington Branch.....100	1,650,000	q'arterly	May 1, '83 5
Berkshire*.....100	600,000	annual..	Apl. 2, '83 1¾
Boston and Albany.....100	20,000,000	q'arterly	May 30, '83 2
Boston & New York Air Line pref....100	2,795,227	semi-an	Apl. 15, '83 2
Boston, Concord & Montreal pref*....100	800,000	semi-an	May 15, '833
Boston and Lowell.....500	3,792,000	semi-an	July 1, '83 2½
Boston and Maine.....100	7,000,000	semi-an	May 15, '83 4
Boston & Providence.....100	4,000,000	semi-an	May 1, '83 4
Attleborough Branch.....100	131,700	semi-an	July 1, '83 3½
Boston, Revere Beach & Lynn.....100	650,000	semi-an	July 1, '83 3
Buffalo, New York & Erie*.....500	950,000	semi-an	June 1, '83 3
Buffalo, New York & Philadelphia pf. 50	6,000,000	q'arterly	June 25, '83 1½
Camden & Atlantic.....50	377,400	q'arterly	Nov. 1, '82 4
" " pref.....100	880,650	q'arterly	Nov. 1, '82 3
Camden & Burlington County.....100	381,925	semi-an	July 1, '83 3
Canada Southern.....100	15,000,000	.....	Aug. 1, '83 2
Cape May & Millville*.....50	447,000	semi-an	June 1, '83 3
Catawissa.....50	1,159,500	annual	Oct. 1, '82 2½
" pref.....00	2,200,000	semi-an	May 16, '83 3½
" new pref.....50	1,000,000	semi-an	May 16, '83 3½
Cayuga and Susquehanna*.....50	589,110	semi-an	July 1, '83 4½
Cedar Rapids & Missouri River*.....100	6,850,400	q'arterly	May 1, '83 1½
" " " pref..100	769,600	semi-an	Feb. 1, '83 3½
Central of Georgia.....100	7,500,000	semi-an	June 26, '83 4
Central Ohio*.....50	2,437,950	semi-an	July 31, '83 3
" pref..50	411,550	semi-an	July 31, '83 3
Central of New Jersey*.....100	18,563,200	q'arterly	Dec. 1, '83 1½
Central Pacific.....150	59,275,500	semi-an	Feb. 1, '83 3
Cheshire preferred.....100	2,153,300	semi-an	July 16, '83 1½
Chicago and Alton.....100	12,504,600	semi-an	Mar. 1, '83 4
" " pref.....100	2,425,400	semi-an	Mar. 1, '83 4
Chicago, Burlington & Quincy.....100	69,814,191	q'arterly	June 15, '83 2
Chicago, Iowa & Nebraska*.....100	3,916,200	semi-an	July 1, '83 4
Chicago, Milwaukee & St. Paul.....100	27,964,261	semi-an	Apl. 16, '83 3½
" " " pref...100	16,540,983	semi-an	Apl. 16, '83 3½
Chicago & Northwestern.....100	16,737,655	semi-an	June 28, '83 3½
" " pref.....100	22,210,844	q'arterly	June 28, '83 2
Chicago, Rock Island & Pacific.....100	41,960,000	q'arterly	Aug. 1, '83 1¾
Chicago & West Michigan.....100	6,796,800	semi-an	Feb. 15, 83 3
Chicago, St. Paul, Minn. & Omaha pf..100	11,396,600	q'arterly	July 20, '83 1¾
Cincinnati, Hamilton & Dayton.....100	3,500,000	semi-an	Jan. 5, '83 3
" " " pref..100	347,900	q'arterly	July 1, '83 1½
Cincinnati, Ind., St. Louis & Chicago.100	8,000,000	q'arterly	July 16, '83 1½
Cincinnati, Sandusky & Cleveland pf. 50	428,850	semi-an	May 1, '83 3
Cleveland Columbus, Cincin. & Ind..100	14,991,800	.....	Feb. 1, '83 2
Cleveland & Pittsburg*.....50	11,235,430	q'arterly	June 1, '83 1¾
Columbus & Xenia*.....50	1,786,200	q'arterly	June 10, '83 2
Columbus, Hocking Valley & Toledo.100	10,316,500	.....	Jan. 10, '83 2½
Concord.....50	1,500,000	semi-an	May 1, '83 5
Concord and Portsmouth*.....100	350,000	semi-an	June 28, '83 3½
Connecticut & Passumpsic Rivers....100	2,244,400	semi-an	Aug. 1, '83 3
Connecticut River.....100	2,370,000	semi-an	July 1, '83 4
Cumberland Valley.....50	1,292,950	q'arterly	July 2, '83 2½
" 1st pref.....50	241,900	semi-an	July 2, '83 4
" 2d pref.....50	243,000	semi-an	July 2, '83 4
Danbury & Norwalk.....50	600,000	semi-an	Apl. 1, '83 2½
Dayton and Michigan*.....50	2,402,573	semi-an	Apl. 1, '83 1¾
" " pref.....50	1,211,250	q'arterly	July 1, '83 2
Delaware*.....25	1,468,940	semi-an	July 2, '83 3
Delaware & Bound Brook*.....100	1,652,000	q'arterly	May 14, '83 1¾
Delaware, Lackawanna & Western....50	26,200,000	q'arterly	July 20, '83 2
Denver & Rio Grande.....100	33,000,000	q'arterly	Jan. 14, '82 1½
Detroit, Lansing & Northern.....100	1,825,600	semi-an	Feb. 15, '83 3
" " " pref.....100	2,503,380	semi-an	Feb. 15, '83 3
Dubuque & Sioux City*.....100	5,000,000	semi-an	Apl. 16, '83 3
East Pennsylvania*.....50	1,709,550	semi-an	July 17, '83 3
East Mahanoy*.....50	392,950	semi-an	July 16, '83 3
Eastern (N. H.).....100	492,500	semi-an	June 15, '83 2¼
Eel River.....100	3,000,000	q'arterly	June 5, '83 1
Elmira & Williamsport*.....50	500,000	semi-an	May 1, '83 2½
" " pref.....50	500,000	semi-an	July 1, '83 3½
Erie and Pittsburgh*.....50	1,998,400	q'arterly	June 10, '83 1¾
European & North American.....100	2,500,000	semi-an	Apl. 1, '83 2½
Evansville & Terre Haute.....50	3,100,000	.....	Jan. 1, '83 6b
Fitchburg.....100	4,950,000	semi-an	July 1, '83 3
Flint & Pere Marquette pref.....100	6,500,000	semi-an	July 16, '83 3½
Fort Wayne & Jackson pref.....100	2,284,800	.....	May 4, '82 2
Georgia.....100	4,200,000	q'arterly	July 15, '83 2½
Granite.....100	1,250,000	semi-an	July 2, '83 3
Greenwich & Johnsonville.....100	118,000	semi-an	Jan. 1, '83 4
Hannibal & St. Joseph pref.....100	5,083,024	semi-an	Feb. 15, '83 3
Harrisburg & Lancaster.....50	1,182,500	semi-an	July 10, '83 3½
Hartford & Connecticut Western.....100	2,700,000	.....	Dec. 1, '82 1½
Housatonic pref.....100	1,180,000	q'arterly	July 16, '83 2
Illinois Central.....100	39,000,000	semi-an	Mar. 1, '83 4
Iowa Falls & Sioux City*.....100	4,623,500	q'arterly	June 1, '83 1½
Iowa R.R.& Land Co.....100	7,620,000	q'arterly	May 1, '83 1
Joliet and Chicago*.....100	1,500,000	q'arterly	July 1, '83, 1¾
Kansas City, Fort Scott & Gulf.....100	4,648,000	.....	Feb. 15, '83 3
" " " pref.100	2,750,000	semi-an	Feb. 15, '83, 4
Lake Shore & Michigan Southern....100	49,466,500	q'artery	Aug. 1, '83, 2
" " (guar.)..100	533,500	semi-an.	Aug. 1, '83, 5
Lawrence*.....50	450,000	q'arterly	July 1, '83, 2
Lehigh Valley.....50	27,496,895	q'arterly	July 16, '83 2
" pref.....50	106,300	q'arterly	July 16, '83 2½
Little Miami.....50	4,637,300	q'arterly	June 10, '83 2
Little Schuylkill*.....50	2,646,100	semi-an.	July 13, '83 4½
Long Island.....50	10,000,000	q'arterly	Aug. 1, '83 1
Louisville & Nashville.....100	25,000,000	semi-an.	Feb. 1, '82 3
Lowell & Andover.....100	500,000	semi-an.	Jan. 1, '83 3½
Lykens Valley.....20	600,000	q'rterly.	Jan. 3, '83 2½
Maine Central.....100	3,603,300	semi-an.	Feb. 15, '83 2½
Manchester & Lawrence.....100	1,000,000	semi-an.	May 1, '83 5
Manhattan.....100	13,000,000	.....	.....
" 1st pref.....100	6,500,000	q'rterly.	July 2, '83 1½
" 2d pref.....100	6,500,000	q'rterly.	Jan. 2, '83 1½
Marquette, Houghton & Ontonagon...100	2,756,600	.....	Feb. 15, '83 4
" " pref.100	2,259,026	semi-an.	Feb. 15, '83 4
Massawippi*.....100	400,000	semi-an.	Aug. 1, '83 3
Metropolitan.....100	6,500,000	q'rterly	Oct. 2, '82 1½
Michigan Central.....100	18,738,204	semi-an.	Aug. 1, '83 3
Middlesex Central.....100	280,000	semi-an.	Feb. 1, '83 3
Mill Creek & Minehill*.....50	323,000	semi-an.	July 1, '83 5
Mine Hill & Schuykill Haven*.....50	4,022,500	semi-an.	July 13, '83 3½
Missouri Pacific.....100	30,000,000	q'rterly.	July 2, '83 1¾
Morris and Essex.....50	15,000,000	semi-an.	July 2, '83 3½
Mount Carbon & Port Carbon.....50	282,350	semi-an.	July 2, '83 6
Nashua and Lowell.....100	800,000	semi-an.	May 1, '83 4
Nashua & Rochester.....100	1,305,800	semi-an.	Apl. 2, '83 1½
Nashville & Decatur.....100	1,356,632	semi-an.	June 10, '83 3
Nashville, Chattanooga & St. Louis... 25	6,670,325	semi-an.	Apl. 20, '82 1½
Naugatuck.....100	2,000,000	semi-an.	Jan. 15, '83 5
Nesquehoning Valley*.....50	1,300,000	semi-an.	Mar. 1, '83 3
New Castle & Beaver Valley*.....50	700,000	q'rterly.	July 1, '83 —
New London Northern*.....100	1,500,000	q'rterly.	July 1, '83 1½
New York Central & Hudson River....100	89,428,330	q'rterly.	July 16, '83 2
New York and Harlem.....100	8,500,000	semi-an.	July 2, '83 4
" " pref.....100	1,500,000	semi-an.	July 2, '83 4
" City Line.....—	.....	annual	Apl. 2, '83 2
New York, Lackawanna & Western...100	10,000,000	q'rterly	Apl. 2, '83 1¼
New York, Lake Erie & Western.....100	77,087,600	.....	.....
" " " pref....100	7,987,500	annual..	Jan. 2, '83 6
New York, New Haven & Hartford....100	15,500,000	semi-an.	July 2, '83 5
New York, Ontario & Western pref....100	2,000,000	.....	Mar. 1, '83 12
New York, Providence & Boston.....100	3,000,000	q'rterly.	May 10, '83 2
Niagara Bridge & Canandaigua*.....100	1,000,000	semi-an.	July 1, '83 3
North Carolina*.....100	3,000,000	semi-an.	Sept. 1, '83 3
" " pref.....100	1,000,000	semi-an.	Sept. 1, '83 3
Norfolk & Western pref.....—	15,000,000	q'rterly.	Dec. 15, '82 $1
Northeastern (South Carolina).....50	899,350	.....	Apl. 2, '83 3
North Pennsylvania.....50	4,399,750	q'rterly.	May 25, '83 1¾
Northern Central.....50	6,500,000	semi-an.	July 1, '83 4
Northern New Hampshire.....100	3,068,400	semi-an.	June 1, '83 3
Northern Pacific pref.....100	41,909,132	.....	Jan. 15, '83 11.1
Norwich & Worcester*.....100	2,604,400	semi-an.	July 10, '83 5
Oregon & Transcontinental.....100	40,000,000	q'rterly.	July 16, '83 1½
Old Colony.....100	7,533,800	semi-an.	July 2, '83 3½
Oregon Improvement Co.....100	5,000,000	semi-an.	Mar. 1, '83 3½
Oregon Railway & Navigation Co.....100	18,000,000	q'rterly.	May 1, '83 2½
Oswego & Syracuse.....100	1,320,400	semi-an.	Aug. 1, '83 4½
Panama.....100	7,000,000	semi-an.	Jan. 10, '83 6½
Paterson & Hudson*.....100	630,000	semi-an.	July 3, '83 4
Paterson & Ramapo.....100	248,000	semi-an.	July 1, '83 4½
Pemberton & Hightstown*.....50	342,150	semi-an.	July 1, '83 3
Pennsylvania.....50	85,751,550	semi-an.	May 29, '83 4
Pennsylvania Co.....50	20,000,000	semi-an.	June 15, '83 2
Peoria & Bureau Valley*.....100	1,500,000	semi-an.	Aug. 1, '83 4
Philadelphia, Ger. & Norrist'n*.....50	2,231,900	q'rterly.	June 3, '83 3
Philadelphia and Trenton.....100	1,259,100	q'rterly.	July 10, '83 2½
Philadelphia, Wilmington and Balt...50	11,795,050	semi-an.	July 2, '83 4
Pittsburgh, Fort Wayne & Chicago*..100	19,714,285	q'rterly.	July 3, '83 1¾
" Special Imp.....100	7,698,900	q'rterly.	July 2, '83 1¾
Pittsfield & North Adams.....100	450,000	semi-an.	July 1, '83 2½
Portland, Saco & Portsmouth.....100	1,500,000	semi-an.	July 15, '83 3
Providence & Worcester.....100	2,500,000	semi-an.	July 1, '83 3
Rensselaer & Saratoga*.....100	6,854,100	semi-an.	July 2, '83 4
Richmond & Danville.....100	5,000,000	q'rterly.	Aug. 15, '82 2
Richmond & Petersburg.....100	1,009,300	semi-an.	Aug. 1, '82 2
Rochester & Genesee Valley*.....100	555,200	semi-an.	July 1, '83 3
Rome, Watertown & Ogdensburg.....100	5,293,900	.....	Jan. 1, '83 3
Rutland preferred.....100	4,000,000	semi-an.	Sept. 1, '82 1
Spuyten Duyvil & Port Morris.....100	989,000	semi-an.	Jan. 2, '83 4
St. Louis, Alton & Terre Haute pref..100	2,468,406	.....	May 1, '83 7
St. Louis & San Francisco 1st pref....100	4,500,000	semi-an.	Aug. 1, '83 3½
St. Louis, Jacksonville & Chicago....100	1,293,000	.....	Aug. 1, '83 5
" " " pref..100	1,034,000	.....	Aug. 1, '83 5
St. Paul & Duluth pref.....100	5,121,700	semi-an.	July 1, '83 3½
St. Paul, Minneapolis & Manitoba....100	20,000,000	q'rterly.	Aug. 1, '83 2
Schuylkill Valley*.....50	576,050	semi-an.	Jan. 15, '83 2½
Seaboard & Roanoke.....100	1,302,200	semi-an.	May 1, '83 5
Shamokin Valley & Pottsville.....50	869,450	semi-an.	Feb. 1, '83 3
Shore Line*.....100	1,000,000	semi-an.	July 5, '83 4
Sioux City & Pacific pref.....100	169,000	semi-an.	Apl. 2, '83 3½
South Branch (N. J.)*.....100	438,300	semi-an.	Jan. 2, '83 3
South Western (Ga.)*.....100	5,031,700	semi-an.	June 26, '83 3½
Stockbridge & Pittsfield*.....100	448,700	q'rterly.	Apl. 2, '83 1½
Sunbury & Lewistown.....50	161,000	semi-an.	Apl. 2, '83 3
Syracuse, Binghamton & New York*..100	2,500,000	semi-an.	Feb. 1, '83 2
Terre Haute & Indianapolis.....100	1,988,150	semi-an.	Feb. 1, '83 4
Union Pacific.....100	60,854,105	q rterly.	July 2, '83 1¾
United Companies of New Jersey*....100	21,090,400	q'rterly.	July 10, '83 2½
Utica, Shenango & Susq. Valley.....100	4,000,000	semi-an.	May 1, '83 3
Utica and Black River.....100	1,772,000	semi-an.	Mar 31, '83 2
Vermont and Massachusetts.....100	3,050,000	semi-an.	Apl. 7, '83 3
Vermont Valley.....100	1,000,000	annual	June 30, '83 3

RAILROAD, TRAMWAY AND CANAL DIVIDEND STATEMENT.

(CONTINUED.)

Showing the amount of Stock Outstanding, the Dividend Periods and the date of last Dividend.

Marked thus (*) are leased roads.	Stock out-standing.	Divide'd Periods.	Last Dividend Payable.
Ware River*.....100	750,000	semi-an.	July 5, '83 3½
Warren (N. J.).....100	1,800,000	semi-an.	Apl. 1, '83 3½
West Jersey.....50	1,375,800	semi-an.	Mar. 15, '83 38
Wilmington & Weldon.....100	2,082,400	semi-an.	July 16, '83 3
Wilmington, Columbia & Augusta....100	960,000	semi-an.	July 10, '83 3
Winchester & Potomac*.....100	180,000	semi-an.	July 1, '83 3
Winchester & Strasburg*.....100	74,700	semi-an.	July 1, '83 3
Worcester & Nashua.....75	1,789,800	semi-an.	July 1, '83 1½
TRAMWAYS.			
Baltimore City.....25	1,000,000	annual	Jan. 1, '83 3
Baltimore, Catonsville & El. Mills....100	80,000	semi-an.	Jan. 1, '83 2½
Bleecker Street & Fulton Ferry.....100	900,000	semi-an.	July 1, '82 ¾
Boston & Chelsea pref.....50	110,000	semi-an.	Apl. 2, '83 3
Broadway (Brooklyn).....100	250,000	semi-an.	Apl. 1, '83 3
Broadway & 7th Avenue (New York)..100	2,100,000	q'arterly	Apl. 1, '83 2
Brooklyn City & Newtown.....100	880,600	q'arterly	Apl. 1, '83 3
Brooklyn City.....100	2,000,000	semi-an.	May. 1, '83 3½
Bushwick (Brooklyn).....100	400,000	q'arterly	Apl. 1, '83 3
Cambridge (Mass.).....100	908,000	semi-an.	Apl. 2, '83 4½
Central Park, North & East River.....100	1,800,000	q'arterly	Apl. 1, '83 2
Christopher & Tenth Street.....100	650,000	q'rterly.	Feb. 1, '83 2½
Citizens' (Phil.).....50	192,500	semi-an.	Apl. 1, '83 2½
Citizens' (Pbg.).....50	200,000	q'rterly.	.. ....'80 14½
Coney Island & Brooklyn.....100	500,000	semi-an.	July 1, '83 3
Continental (Phil.).....50	580,000	semi-an.	Jan. 1, '83 –
Dry Dock, East Broadway & Battery..100	1,200,000	semi-an.	May 1, '83 3
Eighth Avenue (New York).....100	1,000,000	q'arterly	Apl. 1, '83 3
Forty-second St. & Grand St. Ferry..100	748,000	q'rterly.	May 1, '83 6
Frankford & Southwark (Phila.).....50	600,000	semi-an.	Apl. 1, '83 4
Germantown, (Phila.).....50	1,540,902	q'rterly.	July 1, '83 2½
Girard College (Phila.).....50	500,000	q'rterly.	July 1, '71 3
Grand Street & Newtown.....100	170,000	semi-an.	Jan. 1, '83 2½
Green & Coates Street (Phila.).....50	708,650	semi-an.	July 13, '83 3
Hestonville, Mantua & Fairmount.....50	299,381	q'rterly.	Jan. 1, '75 4
Highland (Boston).....100	600,000	semi-an.	July 1, '83 4
Lombard & South Streets (Phila.).....25	195,000	semi-an.	Oct. 1, '75 4
Lynn and Boston.....100	200,000	semi-an.	May 1, '83 4
Metropolitan (Boston).....50	1,500,000	semi-an.	July 2, '83 4
Middlesex (Boston).....100	650,000	semi-an.	May 15, '83 3½
Ninth Avenue (New York).....100	797,320	semi-an.	.....
People's (Phila.) pref.....25	115,250	.....	July 1, '82 2
Philadelphia City.....50	475,000	semi-an.	July 1, '82 4
Philadelphia and Darby.....20	200,000	semi-an.	July 1, '81 3½
Philadelphia & Grey's Ferry.....50	308,000	semi-an.	Jan. 1, '82 6
Pittsburgh, Allegheny & Manchester. 50	300,000	q'rterly.	Oct. 1, '81 3
Ridge Avenue (Phila.).....50	420,000	semi-an.	Apl. 1, '83 5½
Second Avenue (New York).....100	1,199,500	semi-an.	Jan. 1, '83 2½
Second & Third Streets (Phila.).....50	771,076	q'rterly.	July 9, '83 4
Seventeenth & Nineteenth sts (Phila.). 50	250,000	semi-an.	July 1, '81 3
Sixth Avenue (New York).....100	750,000	semi-an.	May 1, '83 4½
Somerville (Boston).....100	113,000	semi-an.	May 1, '83 3
South Boston.....50	600,000	semi-an.	July 2, '83 4
Third Avenue, (New York).....100	2,000,000	q'rterly.	May 1, '83 5
Thirteenth & Fifteenth Sts. (Phila.)..50	334,529	q'rterly.	Apl. 1, '83 4
Twenty-third Street (New York).....100	600,000	semi-an.	Feb. 1, '83 4
Union, (Boston).....100	374,300	semi-an.	Jan. 2, '82 4
Union, (Phila.).....50	751,100	semi-an.	Jan. 1, '83 –
West Philadelphia.....50	750,000	semi-an.	July 1, '77 10
CANALS.			
Chesapeake and Delaware.....50	2,078,038	semi-an.	June 1, '75 2
Delaware Division.....50	674,950	semi-an.	Feb. 15, '83 2
Delaware and Hudson.....100	20,000,000	q'rterly.	June 11, '83 1¾
Delaware & Raritan*.....100	5,847,400	q'rterly.	July 10, '83 2½
Lehigh Coal and Navigation.....50	11,273,400	semi-an.	June 6, '83 2½
Monongahela Navigation.....50	1,004,500	semi-an.	Jan. 1, '83 $3
Morris, consolidated.....100	1,025,000	semi-an.	Feb. 1, '83 2
" preferred.....100	1,175,000	semi-an.	Feb. 1, '83 5
Pennsylvania.....50	4,501,200	.....	.....
Schuylkill Navigation com.*.....50	859,100	semi-an.	June 8, '83 35c.
" " pref.....50	3,200,000	semi-an.	June 8, '83 70c.
MISCELLANEOUS.			
Adams Express.....100	12,000,000	q'rterly.	June 1, '83 2
American Express.....50	18,000,000	semi-an.	July 2, '83 3
Calumet & Hecla Mining Co.....50	100,000 S.	q'rterly.	May 15, '83 $5
Central Mining Co.....100	.....	annual.	Feb. 15, '83 $3
Consolidation Coal.....100	10,250,000	semi-an.	Jan. 27, '82 2
George's Creek Coal & Iron.....100	.....	semi-an.	Jan. 1, '83 3
Maryland Coal.....100	4,400,000	semi-an.	Feb. 1, '76 1½
Missouri Valley Land Co.....100	200,000	semi-an.	July 1, '83 $10
National Tube Works.....100	2,000,000	q'rterly.	July 2, '83 2
Pacific Mail Steamship.....100	20,000,000	q'rterly.	May 1, '83 3
Pennsylvania Coal.....50	5,000,000	q'rterly.	May 15, '83 2
Pullman Palace Car.....100	10,000,000	q'rterly.	May 15, '83 2
Quicksilver, com.....100	5,708,700	.....	May 1, '82 2 0.4
" pref.....100	4,291,300	.....	May 1, '82 6
Quincy Mining Co.....25	40,000 shs	semi-an.	Feb. 15, '83 $6
Quincy Railroad Bridge.....100	1,750,000	semi-an.	July 2, '83 8½
Sioux City & Iowa Falls L. & L. Co....100	500,000	semi-an.	July 1, '83 5
Spring Mountain Coal.....100	1,500,000	semi-an.	June 11, '83 3½
Topeka Equipment Co.....100	255,500	semi-an.	Apl. 2, '83 5
United States Express.....100	7,000,000	q'rterly	May 1, '83 1
Wells, Fargo & Co. Express.....100	6,250,000	semi-an.	July 16, '83 4
Western Union Telegraph.....100	80,000,000	q'rterly.	July 16, '83 1¾

Financial and Commercial.

NEW YORK, TUESDAY, July 10, 1883.

CALL loans on stock collaterals during the forenoon were 2½ and 3 per cent.

The posted rates for foreign exchange were 4.85½ and 4.89. The actual rates were as follows: Sixty days, 4.84½@4.84¾; demand, 4.88@4.88¼; cables, 4.88½@4.88¾; commercial bills, 4.83@4.83½.

Continental bills were as follows: Francs, 5.20⅝@5.21¼ and 5.18¼@5.18¾; Reichmarks, 94⅜@94½ and 95@95⅛; Guilders, 39⅞@40 and 40⅛@40¼.

U. S. 4½s are quoted at 112¾@113; U. S. 4s, 118⅞@119¼; U. S. 3s, 103⅛@103⅜; currency 6s, 1885-'99, 127@131.

THE gross earnings of the Lake Shore and Michigan Southern Railway for the half-year ending June 30, 1883, were $9,210,616, the operating expenses and taxes $5,668,779, and the net earnings $3,541,837; from which deduct interest, rentals and dividends on guaranteed stock, amounting to $1,800,000—leaving a balance of $1,741,837, or $3.52 per share. Two dividends of 2 per cent. each have been declared payable May 1 and August 1, amounting to $1,978,660, showing a deficiency of $236,823. Compared with the corresponding period of the previous year, the gross earnings show an increase of $1,257,895, with an increase in operating expenses of $309,103, making the increase in net earnings $948,792. The property is represented as having been kept up to its usual high standard and the cost of doing it has been charged to operating expenses. Nothing has been charged to construction account. If the last half of 1883 yields as good results as the same period of last year ($6.20 per share) the whole year will show an earning of 9¾ per cent.

The gross earnings of the Michigan Central Railroad for the half-year ending June 30, 1883, were $6,740,000, the operating expenses and taxes $4,591,000, and the net earnings, $2,149,000; from which deduct interest and taxes, $1,210,000—leaving a balance of $939,000, divided (as per traffic agreement) $626,000, or two-thirds to the Michigan Central, and $313,000, or one-third to the Canada Southern. A dividend of 3 per cent. amounting to $562,146, has been declared on the capital stock of the Michigan Central, leaving a surplus to that company of $63,854; and a dividend of 2 per cent., or $300,000, on the capital stock of the Canada Southern, leaving a surplus for the six months of $13,000.

The capital stock of the Arkansas and Louisiana Railroad Company has been increased from $1,200,000 to $2,400,000.

The government of Nova Scotia paid into the Bank of Montreal, on the 30th ult., $500,000 and one month's interest, being a portion of the amount awarded to the Halifax and Cape Breton Railway by the arbitrators, a few weeks since. The balance of $558,000 must be paid within three months. The road is now operated by the company for the government.

During the month of June, 51,367 immigrants landed at Castle Garden against 51,189 in the month of June, 1882. The arrivals during the past six months have been 224,494 against 278,335 during the corresponding six months of 1882, a decrease of 53,841.

The capital stock of the Cape Cod Canal Company has been fixed at $5,000,000.

The mints of the United States coined, during the month of June, 85,742 double-eagles, 65,700 eagles, 2,350,200 standard silver dollars, 200 half-dollars, 200 quarter-dollars, 710,200 dimes, 1,803,000 five-cent pieces, 1,500 three-cent pieces, and 6,102,500 one-cent pieces—a total coinage of 11,119,242 pieces, of a value of $4,944,430. During the fiscal year ended June 30, 1883, the mints coined 1,376,306 double-eagles, 660,379 eagles, 355,072 half-eagles, 1,555 three-dollar pieces, 4,055 quarter-eagles, 8,855 gold dollars, 28,111,119 standard silver dollars, 5,519 half dollars, 16,319 quarter-dollars, 7,175,119 dimes, 20,455,488 five-cent pieces,

28,619 three-cent pieces, and 40,467,400 one-cent pieces—a total coinage of 98,665,824 pieces, of a value of $66,192,704, viz: Gold, 2,406,222 pieces, $35,928,927 value; silver, 35,308,076 pieces, $28,835,470 value; minor, 60,951,526 pieces, $1,428,307 value.

At a meeting of the stockholders of the Cincinnati and Eastern Railroad Company, held in Cincinnati on the 2d inst., the action of the directors authorizing the issue of $2,000,000 of mortgage bonds and contracting for the expenditure of the proceeds was approved.

The total assessment of real and personal property in this city for 1883 is $1,276,677,164—an increase, compared with the previous year, of $43,200,765. Notwithstanding this large increase in values, there is a larger relative increase in expenditures, which will require an increase from $2.25 to $2.27 on the one hundred dollars for municipal expenses. The total funded debt of the city is $130,925,561.69; sinking fund for redemption of debt, $35,535,388.59; net funded debt, $95,390,173.10.

A statement of the funded indebtedness of the District of Columbia and the late corporation of Washington, shows that $1,312,150 of the debt has been retired since July 1, 1878, and a reduction made in annual interest charge of $76,992. The issue of District 3.65s to date is $14,502,650. These bonds are limited by law to $15,000,000. The total funded debt of the District is now $21,553,900. The total District debt on which interest has ceased amounts to $5,340.18.

The official statement of the business of all lines of the Pennsylvania Railroad Company east of Pittsburgh and Erie for May, 1883, as compared with the same month in 1882, shows an increase in gross earnings of $194,129, an increase in expenses of $352,244, and a decrease in net earnings of $158,115. The five months of 1883, as compared with the same period of 1882, show an increase in gross earnings of $1,638,617, an increase in expenses of $954,722, and a decrease in net earnings of $683,895. All lines west of Pittsburgh and Erie for the five months of 1883, show a surplus over all liabilities of $351,291, being a gain as compared with the same period of 1882, of $419,606.

The gross earnings of the Philadelphia and Erie Railroad for May, 1883, were $363,359.41, the expenses $226,938.40, and the net earnings $136,421.01; net earnings 1882, $128,780.14—increase, $7,640.87. Net earnings for five months of 1883, $571,650.11; net earnings for five months of 1882, $446,202.78—increase, $125,446.33.

The gross earnings of the Northern Central Railway for May, 1883, were $499,132, the expenses $287,056, and the net earnings $212,076, an increase as compared with the month of May last year of $33,100. The net earnings for the five months of 1883 were $899,309, an increase as compared with the corresponding period last year of $235,344.

The interest-bearing debt of the United States, June 30, 1883, is $1,338,229,150; debt on which interest has ceased since maturity, $7,831,415.26; debt bearing no interest, $538,111,162.81; interest, $12,309,382.33—total debt and interest, $1,896,481,110.40. Of the debt bearing interest, $32,082,600 are bonds bearing interest at five per cent., continued at three and one-half per cent.; $250,000,000 at four and one-half per cent.; $737,586,300 at four per cent.; $304,204,350 at three per cent.; $355,900 refunding certificates, four per cent.; $14,000,000 Navy Pension Fund, four per cent. The debt bearing no interest consists of: Old demand and legal tender notes, $346,740,001; certificates of deposit, $13,375,000; gold and silver certificates, $170,995,471; fractional currency, $7,000,690.81. The cash in the treasury amounts to $345,389,902.92; and the total debt, less cash in treasury, to $1,551,091,207.48, against $1,569,189,408.91 on the first of June, 1883, a decrease during the month of $18,098,201.43, and a decrease since the 30th of June, 1882, of $137,823,253.24. The cash balance available, July 1, 1883, amounts to $151,118,346.54.

Proposed Sale of the Hoosac Tunnel.

The Railroad Committee of the Senate of Massachusetts have reported a bill which provides for the sale of the forty-four miles of railroad, including the Hoosac Tunnel, now owned by the State. Certain capitalists wishing to buy said piece of road, with the view to form a consolidated line of railway to the West, by connecting with the New York, West Shore and Buffalo, at a point about two hundred miles from Boston, the bill was drawn in their behalf. The subsequent inquiry developed strong reasons in its favor. A railroad commissioner of the State stated that he and his fellow commissioners favored the proposed change. It was further said during the inquiry, that under the law of the State, all railroads connected with the tunnel can run through it just as many locomotives as they please, without let or hindrance from its manager. The consequence is that the number of accidents taking place on the piece of road owned by the government, is larger than on all the railways beside, throughout the State. Moreover, by reason of this distinguishing redundancy of mishaps, and from other causes, the income derived by the State from its ownership of the section of line in question, is just about nothing. On the other hand, the sale of the property at four million dollars—the minimum price mentioned—would yield to the seller an income of two hundred thousand dollars a year. These powerful reasons for the change proposed in the bill are met with force by the Boston *Journal*, and other intelligent organs of opinion. The *Journal* proposes that the bill should go over to the next legislature. It considers the matter of sale, and the price obtained, as the least important of the considerations in dealing with the question. The inquiry should be, what would be the effect of the sale of the property upon the business and prosperity of Massachusetts? A mistake in the transfer of its ownership could easily jeopardize the interests involved in the fact that the tunnel is the gateway between the State and the great West, and through it must pass a large proportion of the production of the State to its market, and also a large part of the products of the West for Massachusetts, the states to the East, and for Europe, if Massachusetts is to have a foreign trade? The *Journal* continues thus: "A half-dozen competing railways desire to use this line, and must use it if the State is to realize the most for its large expenditure. Suppose that the Tunnel line should fall into the hands of one of these rival companies—what then? The others would not be likely to receive all the advantages which the one line controlling the tunnel would obtain. This would control the business of the other roads. Again, suppose that the Tunnel line should fall into the hands of a company which would fix rates which would put Boston out of the ports that can compete for foreign trade, the result of the sale would be in the nature of a disaster to Boston." The thorough discussion which is given the bill providing for the sale of the Hoosac Tunnel, does credit to the intelligence and sagacity of the people of the Bay State.

Our Canadian friends have reason for pride and thankfulness in an improvement introduced by the Canada Atlantic Railway on the third instant. The distance from Ottawa to Montreal is 116 miles, previously covered in about three hours and three-quarters, at the best. Now the morning train leaving Ottawa at 8.35 arrives in Montreal at 11.35; and the evening express from Montreal to Ottawa makes the same speed, reaching the latter city at 7.35. This splendid service is practicable because the rolling-stock and road-bed of the Canada Atlantic are in perfect condition.

The Ohio Falls Car Company, at Jeffersonville, Ind., are building ten passenger coaches for the Louisville and Nashville road, to meet the requirements of travel incident to the Southern Exposition at Louisville, in August next.

RAILROAD MEDICAL SERVICE.

(CONTINUED.)

BY S. S. HERRICK, M. D.

SECRETARY BOARD OF HEALTH, STATE OF LOUISIANA.

THE SWEDISH SYSTEM.

For information on this particular subject, I am indebted to the U. S. Consul at Stockholm, Nere A. Elfwing, Esq., who was aided in answering my inquiries by the Director General of the Railways of Sweden.

On the government railways there is generally a physician for every fifty-two kilometres of the line of road, and forty-four physicians altogether are thus employed upon the government roads. The private railways have a medical service closely resembling this system. One of the duties of the medical men is to examine all applicants for employment, and those found laboring under any physical disability such as to disqualify them for duty are rejected. Particular attention is paid to color-blindness and other defects of sight and hearing among those engaged in the movement of trains. They are also required to give their professional services to all those who are entitled to the same.

Relief is granted to the following : 1. All those injured by accidents upon the lines ; 2. In ordinary sickness, to regular employés and their families ; 3. To other employés while in actual service ; 4. To laborers in the shops, who have paid the same contribution as is required of those in the operating department, and also to their families ; 5. To extra laborers who fall sick or are injured while on duty. All the above are also entitled to medicines, at the expense of the company, while under medical treatment. No exception is made against those who have contracted injury or disease by their own fault, as in case of drunkenness, brawls or venereal infection.

Railroads have no special hospitals of their own, but have contracts with the civil hospitals for the admission of suitable cases. There subsistence is provided, as well as attendance and medicines ; and patients are placed in separate rooms or in common wards according to the nature of the case, at the discretion of the physician. Artificial limbs and trusses are provided at the expense of the company, for one occasion, to those who require them for injury received in its service.

Payment of wages is continued to those disabled for service under the following specifications : 1. Full pay for those suffering from injury in the company's service, whether the individual is attended at hospital or in private ; 2. For an ordinary employé in sickness, full pay for a period not exceeding sixty days during the same year, and beyond that time four-fifths to those whose annual salary is more than $325, or five-sixths to those receiving less ; 3. For a clerk at a salary more than $325 per annum, four-fifths of his full pay, or five-sixths if the salary amounts to less than $325 ; 4. Clerks and employés attended in hospitals are entitled to half pay ; 5. Extra employés and laborers who are entitled to medical relief, but do not receive it at hospital, receive an allowance of fifty cents a day during sickness. The above allowances are limited to two months, except when specially ordered by the management after hearing a report of the case.

In addition to the reports required by the railroad company, medical officers are directed to report annually to the Royal Board of Health, and to conform to the royal edicts relative to infectious diseases. They are also required to give attention to the personal hygiene of employés, and to the sanitary condition of railroad carriages, buildings, grounds, etc.

I am informed that provision is made for relief of the families of employés in case of sickness, injury or death, both by the company and by independent associations among the men themselves ; but particulars have not been furnished. It appears that the men have to make regular contributions, but I am not informed to what amount.

Express trains carry supplies of medicines and surgical appliances, for use in case of accident or other emergency on the route.

Cars used for transporting live-stock are always thoroughly cleansed after their discharge. It is stated, "Disinfection has only once been needed in twenty-five years ;" which indicates the total absence of glanders, bovine pest and other infectious diseases among animals in Sweden.

It is apparent, therefore, that the medical service of the Swedish railways is wisely designed, thoroughly organized, and no doubt highly efficient. Its natural results are a high state of physical health and aptitude among employés, and their general contentment and permanence in their engagements.

SPAIN.

Through the kindness of the Chargé d'Affaires *ad interim* of the U. S. Legation at Madrid, Dwight T. Reed, Esq., I have received particulars of the medical service upon the two most important railroad systems of Spain. The chief surgeon of the Madrid, Zaragosa and Alicante Railroad, Dr. R. Carrion, has made a careful report upon the points covered by my circular of inquiries, of which the following is the substance :

The lines are divided into a suitable number of sections, each one of which is supplied with a medical officer ; and all these officers are under the general direction of a chief, who is assisted at the central office by a secretary and several clerks. The number of sections and their limits are liable to change, according to the nature or exigencies of the service ; and in some instances the section-physician is furnished with one or more assistants. The physicians are divided into three classes, according to seniority and experience in the service, and their salaries vary in like order. The usual period of service is five years in the first class ("entrado"), three years in the second ("ascenso"), after which they belong to the third class ("termino"). Extraordinary services or unusual aptitude may bring more rapid promotion. Each physician, in addition to a specified salary, has a certain monthly allowance for traveling and office expenses.

The district physicians are required to attend all individuals injured by railroad accidents, whether travelers or employés ; to wait upon all employés in their ordinary illness, and also members of their families in cases hereafter to be noted ; to make physical examinations of all persons who apply for employment under the company ; to inspect, as often as necessary, all the establishments of the company, with reference to their sanitary condition ; to keep a register of all cases treated, and record of other duties performed, and to report regularly to the surgeon-in-chief ; to assist the other branches of railway service in all questions of a hygienic or medico-legal character, and particularly the legal department in adjusting claims for compensation for injuries suffered by railroad accidents.

While it is the privilege of employés to have private physicians at their own expense, the company's physician must keep himself informed of the nature and progress of the complaint, and report accordingly.

Employés are not entitled to medical relief from the company, if their illness was contracted when they were off duty, nor to those suffering from chronic diseases before entering the company's service, or those whose complaints are due to venereal affections, drunkenness or disorderly conduct. Besides, their pay is stopped during the period of disability. Artisans and laborers engaged by builders and contractors apart from the administration, are not entitled to medical relief ; but as a rule receive a first visit from the section-surgeon, whenever they fall sick or are injured while at work.

The families of employés receive medical relief, when their illness is clearly traceable to local insanitary causes connected with residence along the railroad line ; also when remote from private physicians.

Medicines and surgical appliances are not furnished to those employés whose annual pay exceeds 1,250 pesetas ($250).

The medical service is sustained altogether at the expense of the company, without reserving any portion of the monthly wages of employés. It has no hospital of its own, and no contract with civil hospitals, but allows its people to go to such establishments at their own expense or that of the hospital.

The company has provided a number of *relief-chests*, containing medicines, surgical instruments and appliances for dressing injuries. These are deposited at certain important stations, and carried on the ambulance cars, as required by law. The section physicians also are provided with similar boxes, and with such drugs and medicines as their duties require. Every passenger train carries a relief-box (*botequin de tren*), and the kind adopted by this company contains materials for treating thirty-seven specified medical complaints, six varieties of fracture and twenty simple injuries. The box, therefore, is calculated to meet the requirements of sixty-three different emergencies, such as are most liable to happen upon a railroad train.

In case of sickness or other domestic affliction, the company will advance money for the relief of the family of an employé, with the obligation on his part for its return by subsequent deductions from his pay. On the death of an employé, pecuniary relief is granted to his family, based upon the length of his service, his fidelity and the number of children left fatherless. This is not done according to fixed rules, but each case is considered on its own merits. When the death was due to some ordinary disease, an allowance is granted not exceeding three months' wages; but when due to malarial fever or other malady incident to duty, the allowance is equal to pay for three to five months. The same donation is made to an employé disabled in the company's service, but the right is reserved to increase or diminish it according to circumstances. If the disability is only partial, the sufferer is given such employment as suits his case, whenever opportunity offers.

In 1873 the company established a Provident Fund, for the benefit of the whole body of employés, as a simple gratuity. An employé who has attained sixty years of age and served the company not less than five years, enjoys a full participation in this fund, and its privileges ensue to his widow and legitimate heirs on his death. In case of total physical disability, the same benefit accrues to the employé himself. Moreover, anyone who has fulfilled seventeen years of service is entitled to half of his due participation, on application for the same, without regard to his state of health. The capital of this fund is formed by annual donations by the company, and the accrued interest on its bonds, in which the donations are invested.

There is also an independent relief association, founded by the employés themselves in 1880, upon the following plan: Candidates for membership must be in good health and less than fifty-four years of age. The initiation fee is three pesetas (sixty cents), and the monthly due fifty centimos (ten cents). Whenever a member dies or is disabled, the other contributors are assessed not less than fifty centimos each, and may voluntarily contribute more. Relief is granted once only, payable to the widow and children or nearest legal heirs, in case of death, and in case of disablement, to the member himself. The sum payable consists (1) of double the amount of his monthly payments since becoming a member, together with (2) the final assessments of the surviving members. This association also advances money to members in distress, not exceeding 150 pesetas ($30) or one month's wages, upon an obligation to return the loan by monthly deductions from their pay. The capital of the association is derived (1) from initiation fees, (2) from monthly dues, and (3) from the profits of public entertainments. The board of directors is elected by the members, and the administrative officers serve without pay. The constitution of the association provides that, when the capital shall have become sufficient, pecuniary relief may be granted to sick members, and an infirmary be erected for the accommodation of themselves and their families.

As already intimated, all applicants for employment by the Madrid, Zaragosa and Alicante Railroad must undergo a medical examination by some section-physician, who forwards a certificate of its result to the chief medical officer. Each physician is provided, for his guidance, with a list of infirmities, injuries and deformities, which are settled as absolute or relative disqualifications for service; that is, some of which totally disqualify for all kinds of duty, and others for certain positions.

Regulations relative to transportation of live-stock merely limit the number of animals to be carried in each car. Six horses, eight horned cattle or mules, and fifteen calves or asses are allowed to each car. Twenty-two hogs are allowed to each floor of a car, when their weight exceeds eighty kilograms each; and thirty hogs when the weight is less, or eighty young pigs. On each floor sixty sheep or goats and eighty lambs are allowed. The shipper may, at his own risk, transport larger numbers, provided no car shall carry a heavier burden than its own weight. Nothing is said of regulations to prevent too long confinement of animals in cars, with consequent deprivation of food and water; but it is not improbable that these points are covered by legal enactments.

A similar, but briefer, report has been received, through the same channel, upon the medical service of the Northern Railway Company of Spain. It differs only in some minor features from the foregoing, as thus appears: Each section of the lines has an auxiliary or supernumerary physician, who receives no regular salary. The families of employés are not entitled to medical attendance nor medicines from the company. In case of accident, disease or death of an employé, his family receive pecuniary relief, half of which is furnished by the company and half from the Relief Fund. Every employé is required to contribute one-half per cent of his wages to this fund. There are no rules relative to transportation of live animals. Whenever stock-cars are supposed to be infected, special orders are given for their disinfection.

Such is the enlightened plan of medical service for the railways leading out of Madrid. On the other hand, I am informed by the U. S. Consul at Barcelona that the railroads of Spain have no medical service at all. Evidently he is able to speak only for those lines which enter that city. It is, however, noteworthy that Mr. Bauer, the principal proprietor of the Southern railway system (Madrid, Zaragosa and Alicante), and Mr. Polack, director of the Northern system, both have Teutonic names, suggestive of ideas transplanted from Teutonic to Iberian soil.

[TO BE CONTINUED.]

Color-Blindness.

THE *Railway Review* has just issued an important pamphlet entitled "Control of Defective Vision on Land and Sea; with especial reference to the subject of color-blindness; a resumé of what has been done toward arriving at proper legislative action."

Without entering into technical discussions of the subject, this work gives a full account of the present state of this important agitation. As a supplement to Dr. Jeffries' celebrated work on color-blindness it is invaluable. It should be read not only by all railway men, but by the entire traveling public. It furnishes a guide to proper legislative and corporate action. There is no longer any excuse for ignorance on this subject. The *Railway Review* will send this pamphlet, postpaid, on receipt of twenty-five cents.

ENGINEERS Roebling, Martin and Collingwood, the three chief bridge engineers, all graduated at Rensselaer Polytechnic Institstitute, Troy.

Varnish.

How MANY, in looking at a handsomely varnished surface, stop to think that the varnish has other uses than that of imparting a fine finish. Few, we imagine, give it a second thought, so accustomed are they to seeing the lustrous, mirror-like surface of carriages and coaches; hence the curiosity which at first may have been excited, and the wonder as to how such results could be obtained soon become dulled by every-day contact with the mystery.

We say mystery, and perhaps rightly so, for is there anything more common, and yet so little understood? The class who have been initiated into the mysteries of the process by which the result is obtained, is comparatively small.

What is varnish? Most of us have seen it, and know it to be a clear, limpid fluid. The degree of transparency or paleness is one of the means of determining the grade or quality of it. A fine syrup has much the appearance of a good varnish. The word varnish covers a very wide field, as the term in its fullest sense can embrace all the thousand and one preparations compounded for as many different purposes, but we shall refer only to one branch, that of varnishes for coach and car work, as it is here that the highest perfection is reached, and the greatest skill and intelligence are required in manufacturing.

The three principal ingredients used are Copal Gum, Linseed Oil, and Spirits Turpentine. The nature of the two last named articles is generally known, owing to their commonness, Linseed Oil being the oil obtained by pressure from flaxseed, the grade or quality of which depends upon the locality where the seed is grown. Turpentine is a resinous substance, exuding from various species of trees; that which is used in the manufacture of varnish is almost entirely from pines; the Southern States—the Carolinas, Georgia and Alabama—furnishing the greater part. But the other article, Gum Copal, is more of a stranger. Gum Animi, or Zanzibar gum, (the latter term denoting that it comes from the island of Zanzibar, which lies just off the eastern coast of Africa), is the clearest and hardest of all the Copal gums, and is used in the finest grades of varnishes. It can be distinguished by its rough or "goose-skinned" surface. Benguela gum, from the western coast of Africa, ranks next in commercial value. Kauri gum comes from New Zealand; it is a less expensive gum, and is largely used in the lower grades of varnishes. These gums are dug from the sand by natives, and sold to merchants, by whom they are assorted, graded and prepared for the market. Beautiful specimens of gum are frequently found, which contain insects and leaves imbedded in them, oftentimes of species long since extinct.

Professor W. D. Gunning makes the following interesting comments on this part of the subject:

"We no longer wonder how the insect got into the copal, but how long it has been there. We have no data by which we can fix the time, but we know enough to assure us that it must be reckoned by thousands of years. The revolutions of nature from forest to desert, are never achieved in a day. The crimes of men have 'dried up realms to deserts.' Nature has done the same, but she is never a swift architect of ruin. To have wrought the extinction of a race of trees from Africa, and buried the soil which bore them eighty feet under the sand, must have required many ages.

"The fly or moth which looks as if it had just lit in its crystal coffin, may have been there a hundred thousand years.

"We are sure that it was there, just as you see it to-day, long before there was any man upon the earth."

Almost any encyclopedia will give the constituent parts of varnish, but the *art* of making good varnish is not found in type, and can only be learned by patient, painstaking effort and intelligence.

An essential quality of varnish is that it must harden without losing its transparency, as it must not change the colors it is intended to preserve. It must exclude the action of air, because wood and metals are varnished to protect them from rust and decay. It must also be water-proof, else the effect of the varnish would not be permanent. And a point of primary importance is that it must possess durability.

In combining its various ingredients so that the varnish will answer these requirements, and at the same time work freely under the brush, lies the secret and mystery of varnish-making, and he who best succeeds in accomplishing it confers upon the world a blessing, and upon himself a fortune.

Let us look at a carriage and observe the brilliant surface—smooth as a mirror, and like it, reflecting one's features, though possibly somewhat distorted by a concave or convex panel, as the case may be. The luster appears to have considerable depth, yet we know that it is but slightly removed from the bare wood. Would you suppose that fifteen or sixteen separate coats had been put on to attain this? beginning with the priming or first coat, and following it with various layers, each successive coat suited for its special purpose in this out-growing process; all must be perfect, else the finished job will suffer, for one coat cannot remedy the defects of another. It is this unity of coats and the skill required in laying them, which place carriage-building among the arts, for are not artistic taste, talent and skill all called into play in the production of a carriage of the highest class? Would you criticise one for calling a Brewster-wagon a work of art?

The first varnish made in the United States was at Cambridge, Mass., in the year 1820. It is claimed that prior to that time, some few were accustomed to itinerate over the country, mixing small quantities of varnish in shops where their services were required, but not until the year 1820 was it begun as a regular business, and made for general sale. The manufacturing was begun in a blacksmith shop, and on such a small scale that only a portion of the shop was used, a single kettle for boiling answering all requirements.

This blacksmith shop, or rather the history of it, for the shop was destroyed by fire about 1865, is interesting, apart from the interest naturally belonging to it as the commencement of an industry which was destined to become a great branch of trade, as it was this very shop which Longfellow mentions in his well-known poem, "The Village Blacksmith."

Only those acquainted with the varnish business sufficiently well to give them an insight into its ramifications, understand the magnitude of the trade, and the immense amount of capital engaged in it. From an infant industry it has grown to wonderful proportions; new uses are constantly being found for varnish, by which it embellishes the article to which it is applied, affords satisfaction to the buyer, and profit to the manufacturer. For it is a truism, that whatever adds to the appearance, whether in animate or inanimate nature, whether the addition comes from "a grace snatched beyond the rules of art" or otherwise, increases the pleasing power of the one, and the selling power of the other in a corresponding degree. Art, which in one sense is synonymous with excellence, is entering more and more into the various mechanical pursuits, and the future will reveal a more decided advance than has yet been accomplished.

CHARLES HOWARD.

NEW ORLEANS is very properly congratulating herself on her increasing prominence as a grain exporting port. For the past month, the shipments of grain amounted to 1,317,549 bushels, and for the entire season the receipts there have amounted to 11,732,250 bushels, against 3,640,465 bushels last year, an increase of 218 per cent. Owing to the high water prevailing in the Mississippi at present, the *Times-Democrat* is of the opinion that the grain business of the port will continue late into the summer. There is, it adds, every reason to hope that this river route will not be closed at all to boats and barges this year by low water.

Economy in the Painting of Passenger Cars and Locomotives.

BY A VETERAN.

THE painting of a first-class railway coach is quite an expensive piece of work. "And why so expensive?" you ask. The reply is contained in the following paragraphs: To begin with the raw material, we find that much of the ash, whitewood, etc., used in the frame and panels of the car, is wet or unseasoned; or that workmen who should have a better knowledge of their trade will wet seasoned wood, to swell the grain over brad-holes and screw-holes, in order, as they say, "to partially close over the heads of brads, nails or screws, so that less putty will be required to cover them." The moisture, thus introduced, has not evaporated when they call the painters to paint the work. This sealing up of dampness is but one little devil among the many shall name which create expense.

The painter, although perhaps a good workman, is usually devoid of chemical knowledge, so requisite in the selection of painters' materials, which would enable him at once to determine by inspection, or by analysis, if need be, the nature and properties of the pigment and vehicle which have been selected for him by a purchasing agent or contractor; and he therefore goes at his work blindly, hoping that everything is right, and for aught he knows (and such is often the fact), he besmears panel, frame and stanchion with, it may be, a mixture of barytes and fish oil, cunningly prepared so as to counterfeit an article of real worth. Who knows, when the paint is spread, what its properties are? It looks all right, and they who see it believe it is right. Dash is a good workman. He ought to know! But Mr. Dash may not know; and if he does, he may not let his tongue wag against his bread and butter. Thus the car is *primed*. Had the material, when purchased, been carefully inspected by a competent chemist or expert, engaged for such work, a good result could have been vouched for, but not otherwise.

Again, the employment of an old (and it ought to be obsolete) method of filling the pores of the wood with oil and lead, is another drawback. The trade journals nowadays are teeming with testimonials as to the merits of liquid primings or fillers, (some of which have borne the test of years of trial and experiment) as substitutes for oil and lead, or oil alone. These primings are not a thing of to-day, years have rolled by since the first was introduced, and the finest carriages built in the world, are to-day, and for many years past have been primed with them, over all their parts, and that too with the most satisfactory results.

The priming on and dry, the next coating, of similar material to the first is applied, after the surface has been rubbed, with sandpaper, just enough to open up a new raw and porous surface; for every small grain of lead, touched by the sandpaper, becomes a little hill of dry chalk, ready to suck in its fill of oil from the succeeding coat. Thus the sandpaper proves to be another little devil.

The rough-stuff coats follow, perhaps, and when they have been applied the chemists' knowledge is required to determine what pigment to use, and with what vehicles to mix it. If the pigment be of such a chemical nature as to destroy a portion of the oil used, as would be the case if it contained a strong oxide of iron and manganese, then it should not be found upon a railway car or upon any other job of painting. If it be of such a nature as to require a large portion of lead in mixing, it will not answer, for the rough-stuff must dry moderately quick, and the necessary quantity of dryers to effect such drying, would tend to neutralize the oil or varnish with which the paint was mixed, and leave the lead a dry, crumbling substance where a solid bed of paint was required. Another imp is thus enlisted. The rubbing out of roughstuff passes along slowly, the job is washed, dried off with "shammy" and, possibly, a coat of paint is put on within the hour after the stone left the surface. Another mass of moisture sealed up under the paint, another imp dancing around the car. It matters not what *color* may be employed, light or dark, the result is the same. The work of destruction will go on as readily with one as the other. Many a cloven foot could be discovered in the *color* by an expert, could he but see all that occurred during the coloring, or have an opportunity to analyze the paints, if ready-prepared. Can we look for progress, or a reduction of expenses when such things exist? Every car-shop should have a person thoroughly qualified to prepare the paints, and who would look well to it that they were not tampered with after leaving his hands.

Color-and-varnish follows in direct order; and here there is opportunity for the skill of the chemist, for even the best varnish mixed with poor paint or pigment will give trouble, such as "pitting," "crawling," "enameling," "wrinkling," etc. However, in car painting there is not so much chance for "deviltries" as the carriage painter encounters, for cars are not so likely to be colored in the same manner; that is, instead of using pure lakes, for example, to color a panel, and which in many cases hold a large percentage of alum or alkali—used in their manufacture—the car painter will use a mixture of pigments to produce a dark color, as for instance, that known as the "Pullman color," into which but little lake enters.

Varnishing may be done in an economical manner or otherwise. Much time may be given for rubbing coats to harden, and then much time be spent in rubbing and preparing for the finishing coats. The aim should be to save time in doing the work, so that the varnish on a car may harden well before it is run on the road. The old-fashioned plan of giving from four to seven days for the drying of each coat is no longer necessary, and the "repeating process" is now practiced in many shops, while in England some of the best carriage painters finish their work by "varnishing on the tack" as they call it.

The application of two or more coats of a well-known finishing varnish, with no further preparation than a simple washing, will insure greater durability than is attained where rubbing is practiced, and those who seek for durability will thus gain economy in their work as well.

PAINTING LOCOMOTIVES.

There is, no doubt, as great a chance to economize in the painting of locomotives as in doing the work on the cars, for in painting locomotives the aim is not so much elegance and a brilliant finish as durability. No matter how well finished a locomotive may be, the beauty or luster remains but for a short time, owing to the hard usage and particularly the excessive heat that it is subjected to. Rust on the iron, and grease or oil over all parts, are sorry things for the painter to encounter, and to resist the former and destroy the latter, should be the earnest purpose of the workman.

To guard against rust of the tank and other irons, instead of priming with boiled oil, as many do, let the painter use upon a new job, or one well cleaned, permanent wood filling, which is a well-known anti-damp, and possesses the greatest tenacity of any known liquid primer. He will thereby establish at once a foundation that will hold up the paint, and it will be a long time before rust will form under the pellicle which covers the iron. The tank may be filled or roughstuffed with one-half dry lead and one-half metallic paint, if desired, or with the ready prepared roughstuff, and after it has been rubbed out, a second coat of the permanent wood filling should be applied and well rubbed over with rags. This coating closes up the pores of the roughstuff and aids in keeping out moisture.

It is poor economy not to paint a locomotive well; no matter about extra ornamentation, perhaps, but let there be a good substance of paint and varnish on it, even if it be an egg-shell gloss, for the smoother and neater the engine, the more pride will the engineer or fireman take to "keep her bright and nice." The oily waste with which the varnished parts are rubbed adds durability, for the oil soaks in and supplies the waste which is ever going on in varnish, exposed as it is upon a locomotive, to the constant presence of carbonic acid gas, sulphur, ammonia, etc.

Tramway.

[This department of the AMERICAN RAILROAD JOURNAL is devoted to the interests of Street Railways; and communications, suggestions and items of information relative to their organization, management and appliances are solicited by the editors. All communications should be accompanied by the name and address of the writer. The English nomenclature of "Tramway" is adopted in this department as being of greater convenience and more specific in its meaning than "street railway," though in allusion to individual organizations we shall preserve their corporate titles. It is our hope to nationalize the term Tramway, which is now generally used in every English speaking territory with the exception of the United States.]

Compressed Air Engines for Tramways.

THE application of compressed air to the driving of tram-cars has been successfully demonstrated in England to a large party of gentlemen interested in the subject, the occasion being the trial by the British Mékarski Air Engine Company (Limited) of one of their air engines on the King's-cross and Holloway line of the London Street Tramways. The car which had been fitted up with the Mékarski apparatus was charged with compressed air in the company's stables at Holloway, the pressure in the reservoirs, extending under the platform or floor of the car, being that of thirty atmospheres, or 450 lbs. to the square inch. Two wheels are used in driving the car, the cylinders being five and one-quarter inches in diameter, and having a ten inch stroke. The air, in passing from the reservoirs to the cylinders, bubbles through boiling water and steam of sixty pounds pressure on the inch. This process not only expands the air, but prevents the formation of snow in the cylinders and at the exhaust; moreover, the moisture absorbed by the air acts as a lubricant for the side valves and pistons. The boiling water and steam are contained in a vessel styled a "hot-pot," which, with its regulating valve, is at either end of the car, to enable the vehicle to be driven either way; but if the local authorities permit an arrangement for turning the car at either end of the line, this duplication will be unnecessary. The apparatus under the car, as well as the wheels, is covered in. The working pressure varies from 120 lbs. to 50 lbs. per square inch; the regulating valve consisting essentially of a piston, which, by means of a hand-wheel and screw, is forced into or raised from a vessel in which water and air are contained. The bottom of this vessel is made of an india-rubber diaphragm, the diaphragm being connected with a valve opening against the pressure of steam and air in the hot-pot. With this arrangement, when the piston is forced down into the vessel in which the water is contained, the diaphragm is pressed downwards, and the valve is opened, allowing the steam and air to escape from the hot-pot to the working cylinders. This valve gives the driver a most delicate and beautiful means of varying the pressure, and it is, in addition, automatically regulating. One of the hot-pots, with its regulating valve upon it, has been placed at each end of the car, and means for ingress and egress of passengers is provided; so that, when the end of the journey is reached, the driver takes his reversing handle, and the wheel of the regulating valve, to the opposite end of the car with him, and the conductor changes ends as in the ordinary horse-car. No noise is made with the exhaust of the engines; there is no steam visible, neither is there any smell of fire, or of hot oil or other lubricant for the engines.

Some adaptation has been necessary in the application of the Mékarski system to English tram-cars. Certain modifications were necessary to enable it to fulfill the conditions imposed by the Board of Trade on mechanical traction for passenger tramways in England. Amongst other requirements is the provision of a governor, which, when the car exceeds a speed of ten miles an hour, not only cuts off the steam, or rather the air, from the engines working it, but puts on the brakes. There are other ways of stopping the car. The driver can, from either end, put on the air pressure brake, and he has a foot brake which is continually under his control when the car is in motion, and with which ordinary passenger stops are made. This new method of driving tram-cars will not import any fresh danger into the public thoroughfares As already stated, a governor will prevent the speed exceeding a maximum of ten miles, but, of course, the vehicle will travel at a less rate, indeed at the ordinary rate of horsed-cars; but even when running at its greatest speed the car can be brought to rest in a distance slightly exceeding its own length. The driver also has the power by reversing the engines, of rapidly coming to a standstill. It is noteworthy that in the trial trip to and fro on the line, passing horses were not put out of the even tenor of their way by the new conveyance. Nor is there any danger of an explosion from the compressed atmosphere under the car. Mr. T. Harris, the assistant of Sir Frederick Bramwell, C.E., who is the engineer of the Mékarski Company, states that even if by an accident, assumed for the sake of argument, but in practice all but impossible, the condensed air should be in excess of a pressure of thirty atmospheres, the result would not be an explosion by any means, but every joint and rivet of the reservoirs would become a safety-valve to relieve the pressure, and the only result offensive to passengers would be a loud hissing noise. During the four years the system has been in operation at Nantes, with a daily service of fifteen hours, there has not occurred a single hitch. The car as constructed is licensed to carry thirty-eight passengers, which, with the driver and conductor, will make forty people in all. It weighs about six and a half tons unloaded, and would, under favorable conditions, run a distance of from eight to ten miles without recharging. As soon as the sanction of the police authorities is obtained, the new car will be put on service, and in a short time all the cars on the line will be propelled by air-engines. It should be mentioned that the Mékarski engine has been in use in the streets of Nantes for the last four years.

Railways in Paris.

THE committee on the proposed Metropolitan Railway for Paris has just submitted its report to the Municipal Council. It proposes that the scheme, as now amended, should without delay be forwarded to the Minister of Public Works for examination by the Board of Works and the Council of State, and that a bill should be passed through Parliament authorizing the necessary appropriation. The company to which the concession will be made over will have to construct two lines, one from the Arc de Triomphe to the Lyons station, and another from north to south, from and to points which have not yet been fixed. Plans must be sent in within six months from the date of the act, and the work will have to be completed within three years of the approval of the plans. When the railway yields 7 per cent. to its shareholders, a fourth of the surplus will go to the grantees, and the remaining three-fourths will be applied to the reduction of fares, or any other purpose to be determined on by the municipality. The grantees will have full liberty in the choice of the mode of traction. There will be two classes, one at thirty cents and the other at fifteen cents, whatever the distance, with an option to the grantees to start first a class at fifty cents. The company will have to work also a slow and an express goods service.

Caring for Harness.

THIS is one of the seasons of the year when every person using a harness should see that it is properly cleaned and oiled, to secure its durability. If this were done there would be a great saving in the wear of it as well as in the comfort of the horse, which above all other things should receive the best of attention. There are many farmers who get a new harness and wear it out in a short time, just for the want of a few good oilings. The more it is used in mud and rain, the more care it should have. To clean a

harness, take a small tub of lukewarm water, dissolve about two ounces of sal soda and when your harness soaks a short time you can make quick work of it with a stiff scrub-brush. When almost dry, use good oil freely.

Awards at Chicago.

THE awards made at the National Exposition of Railway Appliances, Chicago, include the following in the department of Street Railway Appliances:

Best iron wheel, silver medal—Baltimore Car Wheel Co.
" Car, gold medal—J. G. Brill & Co.
" Car spring, silver medal—French Spiral Spring Co.
" Draw spring, bronze medal—French Spiral Spring Co.
" Bell cord and fixtures complete, bronze medal—John Stephenson Co. (Limited).
" Fare box, silver medal—J. B. Slawson.
" End lamp, bronze medal—John Stephenson Co. (Limited).
" Hand rail bracket, bronze medal—John Stephenson Co. (Limited).
" Journal bearing, bronze medal—John Stephenson Co. (Limited).
" Door locks, bronze medal—John Stephenson Co. (Limited).
" Registering punch, bronze medal—Beadle & Courtney.
" Registering device, bronze medal—E. Chesterman, "Portable."
" Sheave for sliding door, bronze medal—John Stephenson Co. (Limited).
" Door handle, bronze medal—John Stephenson Co. (Limited).
" Life guard, silver medal—John Stephenson Co. (Limited).
" Street car truck, silver medal—Suspension Car Truck Company.
" Street car switch, bronze medal—A. L. Johnson.
" Street car turn table, silver medal—Wm. Wharton, Jr. & Company.
" Street car crossing, silver medal—Wm. Wharton, Jr., & Company.
" Stationary registering device, silver medal—Lewis & Fowler.
" Street car axle box, silver medal—John Stephenson Co. (Limited).

TRAMWAY NOTES.

THE charters of three of the Chicago street railways expire by limitation during the present year, and, under the original grant, the city has a right to purchase the roads at their appraised value. The proposed renewal of the charters has provoked wide discussion, and a proposition has been made by ten capitalists to advance the money for the purchase of the roads, and to pay into the city treasury, annually, ten per cent. of the gross revenue. The street railway officials deny that such a proposition can be, or has been made. Their supposed willingness to cede the right of the city to revenue from them is shown in an ordinance submitted to the council, recently, that they should pay as yearly licenses, $50 on each car operated, on condition that the charters are renewed for twenty years. The ordinance was referred.

THE Union Passenger Railway Company, Philadelphia, will begin the construction of a cable road on Columbia avenue, Franklin, Seventh and Ninth streets about the middle of July. The plans have been completed, and it is the intention to push the work vigorously, so as to have as much finished as possible before the cold weather sets in next winter. The road will be laid in sections, so that only a small portion of each street will be torn up at a time. The iron tubes are now being cast. The engineer in charge has devised a scheme which will obviate the noise that is made by the movement of the wheels when the cable passes over them.

TRAMWAYS have increased in England alone from ninety-four miles in 1876, to 444 in June, 1882, and the capital invested from £1,250,000 to £6,500,000. In June, 1882, the total length in the United Kingdom was 564 miles, 150 of which belonged to local boards, under the authorization of the enabling law of 1860. London has only seventy miles of tramway, not as many as Rio de Janeiro; Bristol, twelve; Liverpool, thirteen, and Manchester and neighborhood, over forty-two miles. The working expenses absorb seventy to eighty per cent., owing largely to the paving expenses, and the net revenue hardly reaches five per cent.

THE number of the car and conductor cannot be too prominently indicated. We observe that on some lines the figures are painted in large characters at both ends of the car. Whatever may be thought of this plan from the æsthetic point of view, its value in keeping the conductor on his good behavior is indisputable.

MR. John H. Studley, superintendent of the Middlesex Horse Railroad Company, might have celebrated a fortieth anniversary on the 17th ult., for on June 17, 1843, he began taking fares on his father's line of coaches, then running from Charlestown Neck to Brattle street, Boston. The fare was twelve and a half cents.—*Courier.*

THE Lamson Cash Railway Company, of Lowell, Mass., has declared a quarterly dividend of 1¾ per cent. on the increased capital, $1,000,000, payable July 1. The company also declares an extra dividend of $11.56 per share to stockholders of record Feb. 28.

CHICAGO has twenty miles of cable railroad, with 174 cars, and the steam engines do the work of 1,970 horses. The running time between the court house and city limits, a distance of four miles, is twenty-five minutes less than when horses were used.

THE People's Passenger Railroad, Baltimore, with about five miles of track, extending from Fort McHenry to Druid Hill Park, fifty horses and thirteen cars, has been sold at auction. It was purchased by the bondholders for $83,000.

BRADFORD, PENN., was a petty country village in 1875, when oil was struck near by; now it rivals Oil City in population (about ten thousand), and has a handsome exchange, an opera house, a street railroad, and two daily newspapers.

THE Rio Grande Bridge and Tramway Company, of Laredo, Texas, has filed a charter. Capital stock, $500,000.

List of Recent Patents for Inventions Relating to Tramways.

BEARING DATE JUNE 5, 1883.

278,709. Horse-Bell: Aaron D. Jacobus, Newark, N. J. Filed Sept. 22, 1882.
278,754. Fare-Register: Louis A. Touchet, Cambridge, Mass. Filed Dec. 15, 1882.

BEARING DATE JUNE 12, 1883.

279,123. Harness-Saddle: Henry J. Bickle and John E. Bridges, Dungannon, Ontario, Canada. Filed Dec. 26, 1882.
279,139. Horse-Canopy: Frank H. Dibble, Ansonia, Conn. Filed Mar. 31, 1883.
279,149. Crown-Terret for Harness: Henry C. Gill, Madison, Ohio. Filed March 26, 1883.
279,166. Veterinary Medicine: William Huffman, Salt City, Kans. Filed Feb. 27, 1883.
279,171. Bridle-Bit: Leonard S. Longcor, Belvidere, Ill. Filed July 1, 1882.
279,177. Horse-Collar Fastening: Owen H. Morris, New Haven, Conn. Filed March 6, 1883.
279,223. Horseshoe: Oren M. Chase, Detroit, Mich. Filed Jan. 15, 1883.
279,237. Buckle: George N. Freer, Blue Earth City, Minn. Filed April 12, 1883.
279,325. Street-Car Propulsion: Richard F. Bridewell, San Francisco, Cal. Filed Jan. 20, 1882.

BEARING DATE JUNE 19, 1883.

279,758. Adjustable Horseshoe: Peter Hicks, Napa, Cal. Filed Nov. 4, 1882.
279,784. Draft Attachment for Street-Cars: John P. Messer, Cedar Rapids, Iowa. Filed April 2, 1883.

BEARING DATE JUNE 26, 1883.

280,071. Adjustable Calk for Horseshoes: George W. Nickerson, Yarmouth, Mass. Filed Jan. 15, 1883.
280,107. Boot for Soaking Horses' Feet: William G. Wild, Bangor, Me. Filed May 11, 1883.
280,237. Halter: Robert Porter, Ottumwa, Iowa. Filed March 7, 1883.
280,300. Street-Car-Switching System: Thomas B. Estep, Cincinnati, Ohio, assignor of one-half to Hiram M. Stephenson, of Covington, Ky. Filed Sept. 22, 1882.
280,319. Buckle: Riley McCloskey and Daniel J. Coleman, Walla Walla, Wash.; said McCloskey assignor to said Coleman. Filed Dec. 9, 1882.

A Novel Fare-Register.

LOUIS A. TOUCHET, OF CAMBRIDGE, MASS., INVENTOR.

THIS fare-registering device is intended to be a source of revenue to all tramways using steam, as well as a perfect safeguard against dishonest conductors.

In the accompanying cuts, Fig. 1 is a perspective view, with the top removed to show the working mechanism, and mode of carrying by the conductor. Fig. 2 shows the middle compartment of Fig. 1, where the tickets are to be inserted by the conductor or passengers. Fig. 3, the receipt checks for cash fares and ticket fares.

In the use of this fare-register when a cash fare is taken from a passenger by the conductor, the cash strip J corresponding therewith is pulled upwards between its rollers and one of the receipt checks Q detached and given to the passenger, the coupon S, of the check being inserted in the middle compartment, and forced downward by the mechanism operated by the conductor.

When a ticket is taken in payment for fare, the ticket itself is inserted in the middle compartment, as above described for coupon S, and a receipt check is then detached from the corresponding strip J or ticket-strip, and given to the passenger. Checks on the strip for ticket fares are not provided with coupons, this not being necessary, as the ticket itself takes the place of the coupon S, used in collecting a cash fare.

The ticket receipt checks and the cash receipt checks are both of different colors, one being white and the other red or blue, as the fancy of the tramway companies may desire.

Each check that is pulled from the register is properly dated A. M. or P. M. as the case may be. The front of the register is entirely of glass in order that the tickets may be readily seen as they drop to the bottom of the case, and while the entire mechanism within the register can be seen in operation, there is no means by which to ascertain the amount of fare that has been registered, only when opened at the tramway company's offices.

The tramway companies provide the registers with strips and so arrange them as to be inaccessible, except for the purpose of removing the receipt checks as described.

From the foregoing it will be obvious that the strip J, prevents the conductor from defrauding the companies, as the number of checks detached from the strips indicates the number of fares taken, whether the same are in tickets or cash.

The alarm mechanism contained in the register now in course of construction, and for which steps have been taken by the inventor to fully secure all rights by additional letters patent, is a combination which cannot be easily imitated and concealed about the conductor's clothing, for the purpose of deceiving passengers in order not to register the fare; and even should such a thing be attempted on the part of the conductor, the mechanism in the register would fail to work and immediate detection would follow.

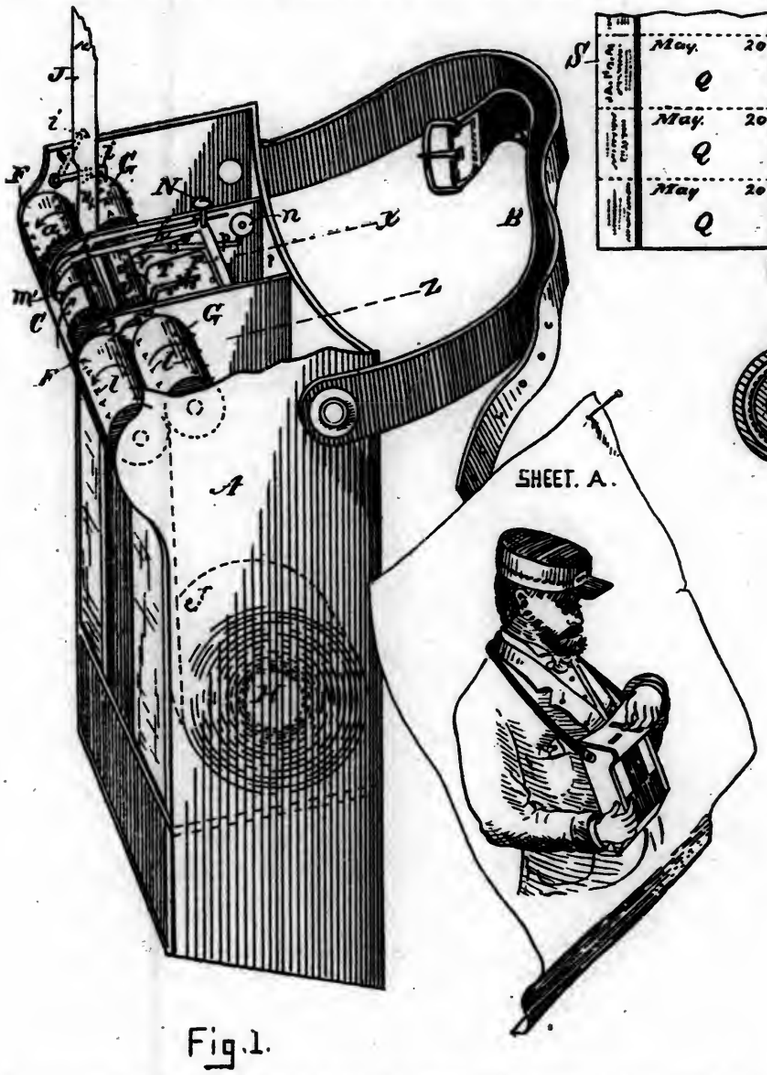


Fig. 1.

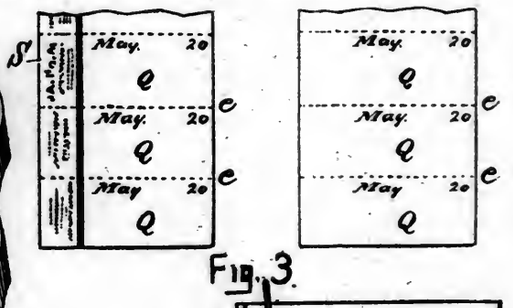


Fig. 3.

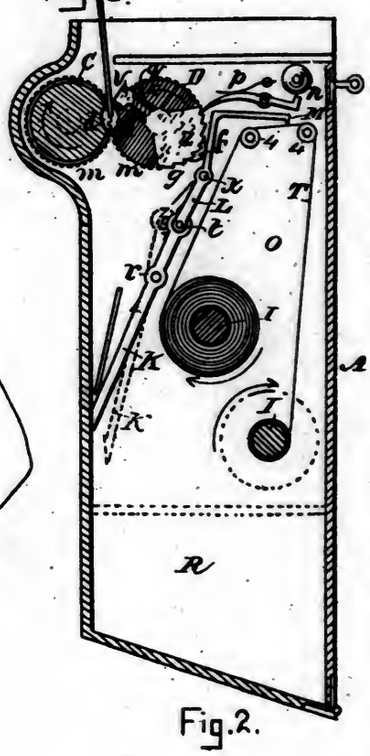


Fig. 2.

These fare-registers are of three different sizes, and have the capacity of registering from five hundred to fifteen hundred, either all cash or all tickets.

The actual experience of a conductor is, without doubt, the best possible means from which a fare-register can be constructed. Not the means to detect, but the means employed to defraud the companies, is what one must possess, in order to accomplish the object in view, when it is considered that the most improved locks can be opened and returned precisely as before opened within five minutes. It is certainly the safer way for the conductor to register every fare as he goes along, and the knocking down seven times out of ten is done by those who are least suspected. However, it is not fair here to give away the poor conductor and his many ways of knocking down; suffice it to say that the inventor claims that with all this knowledge in his possession, he believes that he has overcome, in this fare-register, all the means to defraud the tramway companies to a further extent than any other; and as much as is possible in a fare-register, where the honesty of the conductor is required to operate the same. Even then should the register be opened, which is too often the case, it would avail him naught, as everything within has been canceled and rendered unsaleable.

As these receipt checks are intended and designed to be printed on both sides with advertising cards, it will be obvious that

by judicious management, and by employing solicitors and advertising agencies, a large income can be secured with which to pay the royalty for the use of the register, and as some claim the salary of the conductor, if not more.

Another grand advantage gained by this advertising card on the receipt check, is that local advertisers will take an interest in this device, and watch the conductors to see that their advertisements are paid out, thereby bringing about a result very favorable to the tramway companies.

The trip papers, by which the number of passengers registered is indicated by the number of perforations thereon, the trip slip and dials, and all such devices which can be turned back to any desired point in a moment, by any one who can open the register, have all been avoided in this fare-register. The number of fares registered by this device cannot be altered, not even by the company. *Done never to be undone, but renewed*, so that everything must invariably stand for its full value.

The inventor will be pleased to send further information to any tramway company in the United States and Canada.

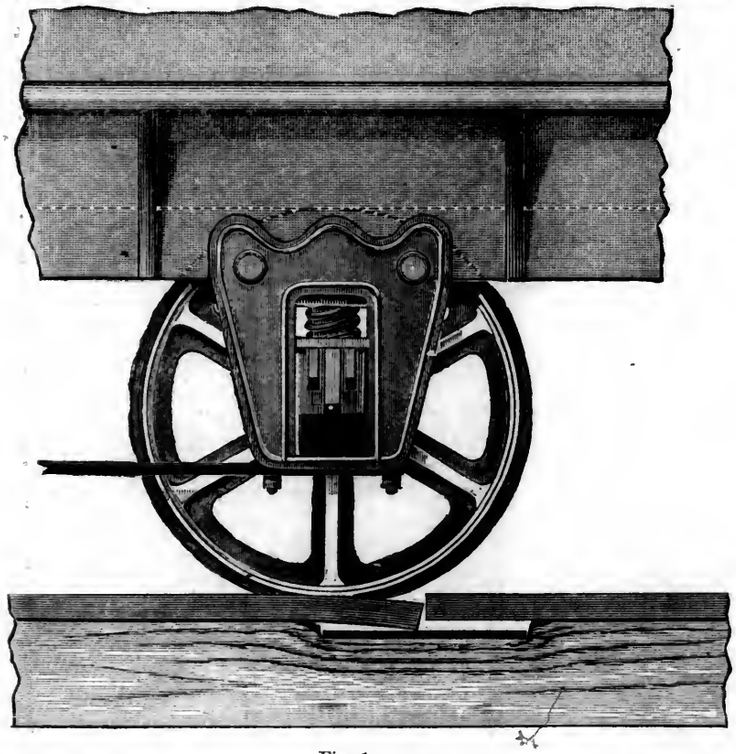


Fig. 1.

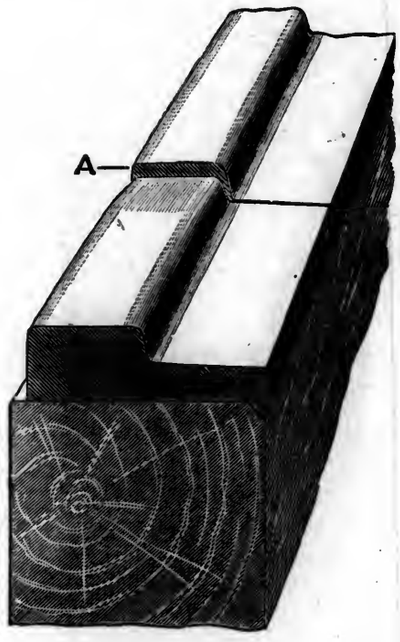


Fig. 2.

On Defective Joints in the Tramway.

THE subject is a large one. It is one of the most troublesome, and in a small way, most costly problems that the tramway has to contend with. Because "there is so much of it." In every mile of single track there are 352 joints. The average mileage per tramway in the United States, is from recent statistics, a little over seven miles of single track. Treating the matter therefore in a general way, each tramway company has to maintain 2462 joints. The defect in a single joint may be a slight one, but a small evil multiplied twenty four hundred and sixty two times becomes worthy of consideration.

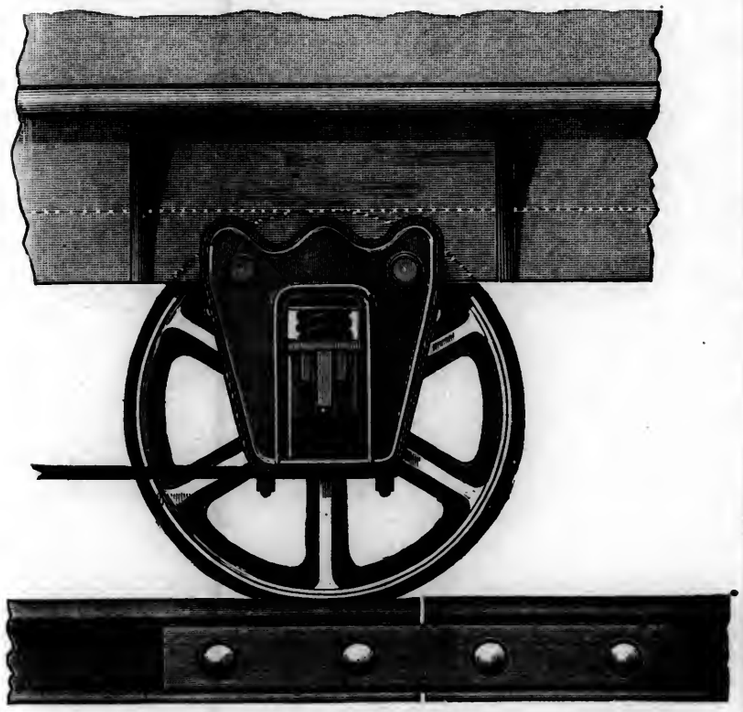
Originally the tram rail was spiked directly to the stringer, and no special provision made for the joint. The latter did not last long. The effect peculiar to the flexible ribbon-like rail of present practice is worth noting. Among some notes culled at random by the writer, is one taken some years ago (1875) from one of Van Nostrand's Magazines. It says: "It is a curious fact that by the most casual glance at a street railway track one who has noted the manner of its wear can tell from that alone the direction in which the cars run thereon, whether 'up' or 'down,' or both. On the north end of the track, the south end of the rail is most worn and vice-versa. The reason for this is that with the imperfect fish joint used (the term employed is incorrect), where indeed any chair or stiffener is used, the weight of the car on the north-bound track depresses the north end of the rail and lifts the south end, partly drawing the spikes therein; and the wheels strike full and hard against the south end of the next rail (raised by the passage of the previous car), and tends to round the head and split the flange vertically, a result which is not long in showing itself. The middle spikes are hardly ever drawn at all; those in the ends are loose, and may be easily drawn, as one might expect from their being partly drawn and re-driven from twenty to sixty times an hour."

The reference describes well the action which occurs, and is interesting as showing that the defects of the present tram-joint were recognized as an evil years ago. It will be seen that some means had to be devised to protect the wooden stringers from this action. And we find such effort made. It at first consisted of a thin iron plate, generally from one-eight to one-quarter of an inch thick, laid under the ends of the rail and set into the timber. The plates were perforated to allow the spikes holding the ends of the rail to pass through them into the stringer. Then it was found advantageous to increase the thickness of the plates, and they were made from three-eights to seven-sixteenths of an inch thick, and were lengthened; the increase in length being added to the end supporting the rail which sustained the greatest shock. A further improvement was effected by making the plates with a flange on either side which gripped the rails and held them from any lateral movement. Owing to the cost of preparing such plates of wrought-iron, cast-iron was resorted to. With the introduction of cast-iron and therefore the comparative economy of making any shape desired, we find the efforts to secure a perfect chair multiplied, many different shapes introduced, and much ingenuity exercised in the effort. Also with the introduction of cast-iron came necessarily a greater thickness of plate and consequently greater cutting away of the stringer. The pocket thus formed became an evil. It held the moisture, rotted the timber, and let down the joints. When this latter tendency is added to the effect above described, we reach the "typical bud-joint," and we have secured it most thoroughly.

The illustrations given, Figs. 1 and 2, do not exaggerate the nature of the joints in many a tramway of to-day. There are some companies who compete most bravely with their joints, and who in spite of the persistency and determination of the joint to be bad do succeed in maintaining a smooth track, but they do it at the cost of infinite patience and great expense.

The usual method is to place a thin liner under the joints as the rail goes down. This is done by drawing the spikes, lifting the ends of the rail, and slipping a thin sheet iron liner from one-sixteenth to one-eight of an inch in thickness under the same, and thus keeping same level.

There are, to-day, two distinct views entertained as to the best form of joint plates; one advocates the use of a cast-iron plate, chilled on its bearing surface to resist the wear, and of sufficient thickness to secure the necessary rigidity. The other urges the use of a thin plate, to be added to continually as the joints go down. There are arguments in favor of both sides. Mr. Aug. Wright, of the North Chicago City Railway company, an engineer of large experience in street railroad construction, has informed the writer that in excessive cases the wear at the joint has been as much as one-eighth of an inch per annum. On an



examination of the plates and the lower part of the rail it is seen that, irrespective of any yielding of the timber, the iron, both of the rail and the plate, wears very quickly. The writer has in his possession a cast iron joint plate in which the difference of wear of the part supporting the end of one rail as compared with the part supporting the end of the other rail is fully five-sixteenths of an inch. In this case the surface was not chilled. From this it would appear that lining up becomes necessary even with the solid cast-iron joint: and it might be urged that if the wear is so great with iron against iron, and so uneven on one part of the joint as compared with the other part thereof, is it not better to save the cost of a thickness, only part of which is utilized. So far, those who advocate the thin liners, appear to have the best of the argument.

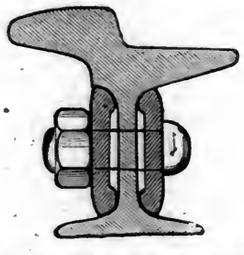
On the other hand, this rapid wear of the joint can be reduced by chilling the bearing or upper surface of the joint plate, while the wear of the rail can be reduced by making same of steel instead of iron. It might be also mentioned in this connection, that the effect of cold sawing a steel rail is to harden the two ends so sawed. It would perhaps be interesting to ascertain how far the hardening effect extended from either end. If found to extend sufficiently far, it might be made further available as a means of reducing the wear at this point. There is again another consideration. In relying upon the use of liners to the extent advocated by those who uphold this policy, we must consider, as a factor in the case, the natural tendency of human nature to defer a needed improvement, particularly when such procrastination carries a delusive economy upon its face. If judged by the latter consideration, and perhaps it is the most potent of all, it would appear to be better to secure a more durable, if more costly joint in the first place.

After all the question arises, if the wear of iron on iron is so great, is it not a wasteful, if not an almost hopeless task to endeavor to maintain such a joint level. There are strong grounds for believing it is.

The matter of joints is not one of cost alone. It is the one item *par excellence* that affects the comfort of the passenger, and one that cannot long be disregarded. A paying tramway will carry say 10,000 passengers per car per year. Suppose a car to run 300 days out of the 365 days in the year, making an average of seventeen hours a day, at an average speed of five miles an hour. This would give us 70,000 passengers carried for 25,500 miles run by the car. Supposing further, that with this traffic, a car averages eight persons continually in the car. In 25,500 miles we have 8,976,000 joints; on the above basis this gives us 1,025 joints as the distribution for each passenger. Two wheels run over every joint, and we therefore have the discomfort of what is equivalent to 2,050 bad joints sustained by each passenger. This is the problem of the future for the tramway system. The one great object to be carried out in making a line pay, is to make it popular. This can only be done by studying the comfort of the passengers. There are few who have not suffered sorely from the discomforts of bad joints. The increasing competition of other means of transit is beyond question going to render it imperative upon street railroad men to carefully consider this problem.

In the case of cable roads, where the passenger traffic is generally heavy, this evil has become one of great moment and of heavy expense.

An article on tramways in a recent issue of this journal, appealed to steam railroad practice as offering a field for copy in many things. We will again secure an example from this field. Formerly the railroad system used a chair or joint plate, similar in its general purpose to that now used by the tramway. Indeed, it is still in use on some of the poorly equipped roads of to-day. But it has been found wanting, and has been virtually discarded. The joint of to-day in railroad practice is the angle fish-plate. And a joint is secured by this means, equal in strength to the rest of the rail. In the tramway, owing to the support of the road-bed, which is wanting in the railroad, a plain splice or fish-joint answers every purpose. We illustrate below such a



joint. It has been found very effective in practice. So smooth is the travel of the car, that experts are unable to detect its joints. As the fit is iron to iron, and of unyielding rigidity, the wear of the rail is no greater at this point than in the rest of the rail, and moreover, once imbedded in the road-bed it is virtually imperishable. There are two points wherein such a joint must be productive of great economy, viz: in repairs to cars, owing to

the smoother track, and in the maintenance of way, owing to the fact that it becomes unnecessary to tamper with the rail. The saving cannot well be less than one-half in these items. By some who have used the joint, it is considered greater.

The following figures are instructive. They are the actual figures of the proportion that the cost of repairs to cars, and to the way, bear to the whole working expenditures on some English street railways. The practice not being to distribute expenses in this country, in this way, we are unable to give data for American practice. Nevertheless, as they are given in percentages, while the amount *per se* may vary, the proportion borne by that amount to the whole cannot be greatly out.

Owing to the perfect track system in vogue in England, the difference, if any, would be towards an increase of the given percentages for this country.

NAME OF LINE.	Repairs of cars. per cent.	Maintenance of way. per cent.
North Metropolitan Railway. .	.4.39	3.07
London Tramways.	.4.77	3.12
London Street Tramways. . .	.4.20	3.27
Dublin Tramways.	.6.22	6.62
Glasgow Corporation Tramway.	.5.26	3.10
Edinburgh Street Tramway. .	.4.83	6.01
Leeds Tramways.	.7.38	3.21
Provincial Tramways. . . .	.8.62	3.38
General Average.	.5.71	3.97

We will reduce this item to dollars and cents. In English practice, the two items amount to 9.68 per cent. of the operating expenses. For the purposes of calculation, we will take a tramway three and one-half miles in length, capitalized at $56,000, in which the gross receipts are forty-three per cent. of the capital, the operating expenses thirty-two per cent. of the capital, and therefore the net receipts or dividends eleven per cent. We have then gross receipts, $24,080.00, operating expenses, $17,920.00, and net receipts, $6.60. The English average of the two items under discussion, is 9.68 per cent. of $17,920.00, or $1,734.65. It would be within the mark if we add to this one-fourth to allow for the far more perfect track system in use in England, and consequently lower percentage of repairs there as compared with American practice. This would give $2,168.31 as cost of maintenance of way, and repair of cars, for three and one-half miles of road, or equal to $619.52 per mile, per annum. If the joint in question would save one-half of this, or $309.76 per mile, it would at the rate of seven per cent. interest, pay for the investment of $44,251.12 per mile to effect the purpose. Surely the matter is worthy of consideration from every point.

Recent Legal Decisions.

SOME POINTS IN RAILROAD LAW—NON-TRANSFERABLE TICKETS NOT TO BE TAKEN UP—RISKS OF EMPLOYES.

T. BOUGHT a third-class railway ticket which was not transferable and sold it to H., who in turn sold it to P. The conductor took up the ticket and required P. to pay his fare. P. sued the company for damages and was given a verdict for $31.70, the value of the ticket. He was not satisfied, and carried the case (Post vs. Chicago and Northwestern R. R. Co.) to the Supreme Court of Nebraska, by which the judgment was affirmed. Judge Maxwell, in the opinion, said: "A regulation of a railroad company providing for cheaper rates of fare between certain points and requiring that the ticket shall be used by the person getting it only and within the days specified upon it is reasonable and proper, and it is of no validity in the hands of a third person. Such a ticket, however, cannot be taken by the conductor from the holder of it, for he is entitled to the possession of it to enable him to recover the amount he paid for it from his vendor."

RAILROAD EMPLOYE TAKING RISK.

A man whose direct duty was on the "bridge gang" of a railroad company was ordered with other men to repair a well which supplied water for the engines. This well was in a dangerous condition, and the workman was badly injured by the earth above falling on him. He sued and recovered damages from the company, which carried the case, in error (Galveston, H. and St. A. R. R. Co. vs. Lempe), to the Supreme Court of Texas, which reversed the judgment. The Chief Justice (Willie), in the opinion, said: "When a person enters the employment of another he assumes all the risks ordinarily incident to the business, and he is supposed to have contracted on these terms, and when he has equal knowledge with the master of the danger incident to the work he takes the risk upon himself if he goes upon it."

DEFECTIVE CARS AND INJURY OF EMPLOYE.

A brakeman was injured in coupling by hand one of the cars of his own road with a freight car of another road which had come into the service of his company, and sued his road for damages and recovered. It was shown that the strange car was defective and that the defects were discoverable on inspection, and the company offered to show by its rules that coupling by hand was prohibited, sticks being prescribed. But on the objection that these rules had fallen into disuse the offer was rejected. In this case (Fay vs. Minneapolis and St. Louis Railroad Company) the company appealed to the Supreme Court of Minnesota, which affirmed the judgment. Judge Vanderburg, in the opinion, said: "These rules cannot be applied in this case; they were no longer enforced; the plaintiff had no notice of them, and it was the accepted, the usual practice, to couple by hand. This strange car having been in the possession of the company long enough to have been duly inspected, the company is liable for an injury suffered by its employé, on the ground that it must supply safe and sufficient instrumentalities for its work."

RAILROAD EMPLOYE EXPOSING HIMSELF TO DANGER.

A railroad laborer, in performing some duty, got out of his car and stood on the oilbox, a covering for the end of an axle of the car, and while there was injured by coming in contact with some "running boards" which projected beyond the edge of the platform. He sued the company and was defeated in the action (Martinsen vs. Chicago, Rock Island and Pacific Railroad Company). He appealed to the Supreme Court of Iowa, which affirmed the judgment. Judge Rothrock, in the opinion, said: "We think the plaintiff put himself needlessly in a dangerous place, and that no one except himself is to blame for the consequences."

SHERIFF'S SALE ADVERTISED ON SUNDAY.

An injunction was refused to a judgment debtor whose real property was advertised to be sold on execution in a Sunday paper. He appealed the case (Shaw vs. Williams) to the Supreme Court of Indiana, which decided in his favor. Judge Elliott, in the opinion, said: "A sheriff can do no business on Sunday unless it is of an extraordinary character, and it cannot be said that the advertisement of an auction sale is anything more than a usual act on his part."

NUISANCE CREATED BY A RAILROAD COMPANY.

The engine house and repair shop of a railroad company were so conducted that the congregation of a church built and occupied before these buildings of the company were put up and used, were injured in their clothing and greatly discommoded in their worship. In a suit for damages a judgment of $4,500 was recovered, and the case, in error (Baltimore and Ohio Railroad Company vs. Fifth Baptist Church), was carried to the Supreme Court of the United States, which affirmed the judgment. Mr. Justice Field, in the opinion, said: "That is a nuisance which annoys and disturbs one in the possession of his property, rendering its ordinary use or occupation physically uncomfortable to him. For such annoyance and discomfort the courts of law will afford redress by giving damages against the wrong-doer, and when the cause of the annoyance and discomfort is continuous, courts of equity will interfere and restrain the nuisance."

The Type-Writer.

PROMINENT among a multitude of time and labor-saving machines found at the Chicago "National Exposition of Railway Appliances," was the Remington Standard Type-Writer, exhibited by Messrs. Wyckoff, Seamans & Benedict, 38 East Madison St., Chicago, Ill., and 281 & 283 Broadway, New York, sole agents.

Although railroad officers were at first slow in recognizing this instrument as an essential and necessary railroad appliance, and its introduction in such direction is of comparatively recent date, yet now very few railroad offices are run without the aid of these wonderful little machines. In fact, they have become indispensable in the facilitating of a necessarily large correspondence.

The Standard machine, as now manufactured by E. Remington & Sons, of Ilion, N. Y., has so nearly reached perfection that it is sent forth under an *absolute warranty*, and owners and operators agree in saying that they are seldom if ever called upon to make even the slightest outlay for repairs, during years of constant hard service. It is so simple in construction in all its details, and so easily manipulated, that any person of ordinary intellect can learn to use it in a very brief time; and can write at a speed much greater than that with the pen after a few days' practice; while the more experienced and expert operator will prepare most perfect copy, with capitals, small letters, figures, and punctuation, at the rate of from *sixty to ninety words per minute*, or at *three times* the speed attained by the most rapid penman. And this rate can be kept up hour after hour with little or no fatigue as compared to that of pen-writing. *Practice* only, is required to produce the most skillful and rapid operator. Even *the blind* soon learn to use it successfully. And for this unfortunate class of citizens we can scarcely imagine a greater boon. The case of Mrs. C. L. Crandall, the estimable wife of Prof. Crandall, of Cornell University, who though totally blind operates the type-writer rapidly and accurately, is one directly in point.

When an operator is so fortunate as to have combined with his type-writing a knowledge of short-hand, he readily does the work usually accomplished by *six or eight* "long-hand" writers in the same time.

Recent experiments have demonstrated that any intelligent telegraph operator can, after a few weeks' practice, receive directly from the "sounder" and at the same time transcribe with the type-writer, using upper and lower-case letters, putting in all the punctuation marks, etc.; in short, *making a perfect copy as the matter comes from the wires*, more rapidly and easily than is possible with pen or pencil. In fact, *several copies* can be taken at the same time in the same way—by using sheets of paper interlaid with carbon—all as legible as print. If managers of telegraph offices would insist upon having their operators use these machines, a large amount of time and trouble would be saved to the Press and others, who are compelled to decipher the hurried pen-work of receivers of Press dispatches. A notable example of what may be accomplished in this direction is to be found in the experience of Mr. Charles F. Lantry, telegraph operator at Elmira, N. Y., who says in a letter referring to his method of receiving Press dispatches, that although he has but just begun to use the type-writer for taking "Press" matter, he is able to receive from the wires by the hour without breaking, and with far less fatigue than when using the pen.

The demand for this machine has increased from sixty to one hundred per week, within the last year, and is still increasing so rapidly that the facilities of the manufacturers are taxed to their utmost to meet it.

The writing machine should be, and soon will be adopted, not only by railroad companies, but by all persons having writing to do, without regard to position, business, or profession.

[The foregoing article was handed us by our representative at the "Exposition" at Chicago. It may be added that the type-writer is in use in the offices of the JOURNAL, giving satisfaction; and it is believed by the management that the new and important departure in conjunction with the telegraph, to which reference is so opportunely made, is yet to be utilized in almost unlimited degree. The statement as to uses of the type-writer by the blind, are also worthy of consideration.—AMERICAN RAILROAD JOURNAL].

Railroad Construction in the Northwest.

THE Marquette and Mackinaw Railroad is to be extended from Marquette to the iron mines, and a branch line is to be built from the main line to Sault Ste. Marie.

Messrs. Newberry & McMillan and Francis Palms, of Detroit, in order to secure better terms and accommodations in handling their iron ores, will build and own a road for themselves. The Marquette, Houghton and Ontonagon Railroad, now and for a long time has done the whole of the freight business between Marquette and the mines. Newberry & McMillan, Francis Palms and the group of capitalists known as the George I. Seney Syndicate (who built the Nickel Plate Railroad), have raised a fund of $2,000,000 for the improvements contemplated, and General Manager McCool, of the Marquette and Mackinaw Railroad, is now at work superintending the location of the extension from Marquette to Negamee and Ishpeming, upon which the work of grading and construction will begin in a very short time. The length of the road to be built from Marquette to the mines, is fourteen miles, which with various little spurs of line to the several mines makes a total of seventeen miles. The country through which it is to be built is very uneven and rocky, and the cost of the work will be upwards of $40,000 per mile. The length of the branch road from the main line to Sault Ste. Marie is forty-eight miles (three surveys preliminary have already been made, but the located line is not yet known) through a heavily timbered country. In connection with the branch road its builders will construct a bridge across the ship canal and St. Mary's River, and by the terms of the charter (provided by an act passed by the Dominion Parliament, and by a bill passed by the Congress of the United States), the bridge must be completed before 1886. Newberry & McMillan have two iron furnaces on the Marquette and Mackinaw road, and the extensive ore wharfs at St. Ignace, besides two or three furnaces on the Grand Rapids and Indiana Railroad. They will also construct extensive ore wharfs at Marquette. It is in the handling of ore for these places and for shipment down the lakes that the immediate benefits of the extension to the mines will result. The Canadian Pacific Railroad and the Grand Trunk Railroad have built their roads to within sixty miles of St. Mary's River, and, when completed to that point, the bridge across the river and the extension must bring large patronage from both Southeast and East and West and Northwest. In addition there are the lumber and grain interests of Chippewa County, which will provide liberal local traffic.

GEORGE H. CORLISS, at whose works in Rhode Island the big Centennial engine was built, is building the engine for the first cotton mills to be erected in China. The Chinese are becoming so civilized that they will soon be able to compete with the rest of the world in making silks and satins, nine-tenths cotton and one-tenth shine.

A RAILROAD was opened recently between Tiflis, the capital of Transcaucasia, and Bakou, one of the ports on the Caspian Sea. It is intended to connect this last with the Black Sea. This road reduces communication from five days to fifteen hours between Tiflis and Bakou. It is the greatest commercial achievement yet of Alexander III's reign. The line traverses a region reputed to be enormously rich in petroleum. The petroleum business was at its outset almost entirely in the hands of Armenians, but it is now shared by persons of divers nationalities.

A Club for Strangers.

Success of the Junior Century.

Methods and aims of a peculiar social organization.

The Junior Century is the title of an association connected with Grace Church parish, and sustained by the thoughtful munificence of the parishioners. Yet it is not a parish society, nor a church society. It is not a diluted form, even, of a Christian association; nor is it an evangelical mission under a thin disguise of bookish philanthropy. Nor is it a snug harbor or rallying ground for idle "cranks" or tramps; nor a Holly Tree Inn, with its pious dole of tracts and coffee. It is approached through a fascinating bit of city gardening. It nestles in a group of commanding Gothic architecture in white marble. One must pass under the shadow of a church and by the door of a rectory to enter it, but there is nothing intrusive in either. Indeed, it is unlike any other club. No trade or profession or creed or sex monopolizes it. No golden key or heavy bank account will open its doors, and no burdensome dues or fees or assessments break in upon the repose of its membership.

To be sure, one misses the fumes of a busy kitchen. There is a want of wine cellars and the festive atmosphere of the bar-room and restaurant. One misses the flashy slang, the ill-flavored stories, the shuffling cards with well-spiced "points," and the everlasting patter of "sports" and stock operators. A clean bill of honesty and morality alone will open the doors of the Junior Century, and one must be a dweller in lodgings, lonely or a stranger, and busied in some respectable calling. In short, the Rector of Grace Church in this organization had in mind that large class of striving, deserving, unfriended, yet intelligent men and women, to whom the enforced solitude and isolation of a great city come with keenest privations of fellowship, home and its community of thought and feeling.

The surest welcome to the hospitality of the Junior Club is to experience the sorest need of it. Opening with some fifty members, it has strained its limits to its legitimate "hundred," with fifty-five more. There is positively no religious test or consideration recognized. A clergyman is usually in attendance during the day, but in the club-room he is the gentleman and not the ecclesiastic. The first floor is a bright, prettily furnished apartment, with a well-appointed table for reading and writing, comfortable chairs, files of papers, the current magazines, and all the appliances of a well-ordered reading-room. A carefully selected library occupies shelves on one side of the apartment, books meant for instruction as well as for recreation. Each member serves as his own librarian, leaving his card of membership in a place opposite his name when a book is drawn. There are more than 1,000 volumes, and additions are continually made as special wants are developed. A short time ago the members were invited to send in lists of such works as they consider especially desirable or valuable. More than 500 titles were recorded, covering an admirable range of literature, and every volume, with a few exceptions of very costly publications, was at once purchased. Indeed, the membership in this and in many practical details of club activities, exercise a personal influence on committees and in offices of trust. Adjacent to the reading-room is a snug little room devoted to chess and the more informal intercourse of the men, where tobacco is not excluded. The rooms are open afternoons and evenings.

On the floor above is a more spacious suite of rooms, where a woman's bonnet finds a home. This is open during the whole day and evening, and a matron is in constant attendance, who answers the summons of the bell. These rooms are furnished rather more attractively than those down stairs, and are supplemented with spacious and admirably appointed retiring rooms, where baths may be ordered at the convenience of the women. Half of the library is kept up-stairs, half below; a complete catalogue, however, in both rooms, and a desired volume may be sent for at any moment by summoning the janitor or matron.

It is clearly felt by all interested that no obligations are incurred and no charities extended. The relation nowhere touches or challenges the self-respect of the members. It is their home, under the regulations of the club, without let or hindrance or reservation so long as membership is kept up. On the first Monday of each month both branches meet in the women's club rooms, with certain invited guests. Conversations, discussions, criticism of new books or striking magazine articles fill the time. Introductions are made, acquaintances formed, and a strong and restful social element enters into the evening. It concludes with light, wholesome refreshments, and proves an occasion of most welcome recreation. On the third Monday evening of each month both branches of the club again meet, and a pre-arranged entertainment, musical, literary, or miscellaneous, is provided by the club committee, acting in concert with the parish board, and always reinforced by the ready and sagacious help of the clergy; some of the best professional talent of the city has assisted on these evenings. Sometimes the celebrated choir of the church lend their services, and sometimes brilliant amateurs belonging to the congregation contribute to the pleasures of the evenings, But the entertainment is invariably attractive. These two monthly reunions involve no expense whatever for the membership, but are provided by the parishioners, who, however, keep steadily in the background. The clergy appear on these occasions in a companionable, social way, giving introductions to the readers, lecturers or artists, and bringing people together who are strangers. Here are two agreeable, wholesome evenings provided for each month; surely something accomplished is breaking in upon a strange, lonely life in the city.

The club-rooms are generously supplied with gratuitous stationery, and may be used for correspondence, interviews with friends, and especially by women in lodgings for the calls which they may receive. The women's rooms, however, are never accessible to men save on the two monthly evenings already mentioned and no one is then received without the club introduction, which is made a sufficient guarantee of respectability.

It is naturally inquired at what charges the Junior Century is available to its membership. The charges are merely nominal, and so fixed that while the absolute independence of the membership is secured, the member may yet do something regularly for the fund. All contribute twenty-five cents monthly, or two dollars and a half each year; and there are no contingent charges or assessments. It is difficult to estimate the steady measure or practical benefit flowing from this unique organization. Women come to New York for special studies in music and art at the Cooper Union and elsewhere, or to prepare for teachers' work, or to take classes in schools, or to pursue some other honorable industry. A proper letter of introduction is recognized gladly by the parish committee, and the stranger finds herself at once relieved from the loneliness and wretchedness of lodging or boarding house life, introduced among intelligent and congenial people, and the best substitute for home safeguards and privileges placed within her reach. Young men—students, clerks, those entering mercantile or professional life, without domestic or social relations—here meet on common grounds of intelligent and well-ordered intercourse. Already incidents are recorded which illustrate abundantly the far-reaching helpfulness of the Junior Century, and it is only necessary to meet any of its membership to learn how well it does its work. The opportunity is by no means exhausted; there is room for many more Junior Centuries in New York; and large cities elsewhere may profitably follow the example of Grace Church in her care for the stranger and friendless.

The cheap production of steel rails was invented by Bessemer in 1856, less than thirty years ago, and with consequences of incalculable importance to the railroad industry.

New Inventions.

TO INVENTORS AND PATENTEES.

THIS department is devoted to the notice, consideration and description of new and valuable inventions applicable to Railroads, Steam Navigation, Machinery, Manufactures, Mining and Tramways. New patents of this description appearing in the weekly Official Gazette of the Patent Office are duly noticed in our columns, and full descriptions of those most useful and important are published *free of charge*.

☞ Inventors, Patentees, and the holders of Patents are requested to forward us their claims and specifications, with description of their inventions for our examination with a view to their publication in this department. Descriptive cuts, diagrams, and illustrations of the same are also desired.

☞ In selecting inventions for full description in this department, the editor will be guided solely by their importance and value, and their interest to the readers of the AMERICAN RAILROAD JOURNAL.

List of Patents for Inventions Relating to Railways, Machinery, Etc.

BEARING DATE JUNE 5, 1883.

278,678. Track-Bolt Lock: D. Franklin Blighton, Buffalo, N. Y. Filed April 20, 1883.

278,693. Car-Coupling: Wm. Emmett, Logansport, Ind. Filed Oct. 11, 1882.

278,698. Car-Axle Box: James Garland and James Kenyon, Lynchburg, Va. Filed Jan. 22, 1883.

278,726. Car-Wheel: Jno. R. Morgan, Alliance, Ohio. Filed Feb. 23, 1883.

278,728. Car-Coupling: Walter B. Nichols, Danville, Ky. Filed March 29, 1883.

278,757. Shelf for Refrigerator-Cars: Robert H. Waters, Malden, Mass., assignor to the Post Refrigerator Car Compay, Portland, Me. Filed Oct. 27, 1882.

278,764. Car-Coupling: James S. Bayley, York, Pa. Filed Feb. 13, 1883.

278,770. Railway Running-Gear: Chas. Brown, Winterthur, Switzerland. Filed April 25, 1883. Patented in France Oct. 14, 1882, No. 151,570.

278,789. Car-Coupling: Walter F. Freeman, Mineola, Tex., assignor, by direct and mesne assignments, of three-fourths to Robertson F. Shrewder, George A. Cage, and Benjamin F. Read, all of same place. Filed Oct. 28, 1882.

278,813. Draft-Regulator for Locomotive and other Furnaces: Horace W. Norwood, Philadelphia, Pa., assignor to the Norwood Spark Preventive and Smoke Consuming Company, Camden, N. J. Filed Dec. 15, 1882.

278,814. Draft-Regulator: Horace W. Norwood, Philadelphia, Pa., assignor to the Norwood Spark Preventive and Smoke Consuming Company, Camden, N. J. Filed Nov. 9, 1882.

278,831. Car-Signal: Salmon Thompson and William E. Farrell, Masonville, Iowa. Filed July 27, 1882.

278,833. Car-Brake: Wm. B. Turner, New York, N. Y., assignor of one-half to Cornelius Beard, same place. Filed Nov. 15, 1882.

278,838. Car-Coupling: Cary Van Deusen, Hudson, N. Y. Filed April 12, 1883.

278,843. Car-Wheel: Henry G. Yates, San Francisco, Cal., assignor, by direct and mesne assignments, to the Planetary Wheel Manufacturing Company, of California. Filed Oct. 2, 1882.

278,880. Car-Coupling: A. Wells Case, South Manchester, Conn. Filed Mar. 7, 1883.

278,895. Door and Door Attachment for Grain-Cars: Charles C. Duffy, Newport News, Va. Filed Oct. 2, 1882.

278,940. Electric Railway-Signal: William Hadden, Brooklyn, assignor to the American Railway Signal Company, New York, N. Y. Filed Aug. 26, 1882.

278,964. Railway-Car-Axle Lubricator: Chas. P. Holmes, Gouverneur, N. Y. Filed Feb. 27, 1883.

278,978. Manufacture of Railroad-Ties from the Refuse of Sugar-Cane: Edward C. Le Bourgeois, Springfield, Mass. Filed Oct. 28, 1882.

279,008. Electric Motor: Charles C. Peck and William H. Chapman, Middlebury, Vt. Filed Jan. 15, 1883.

279,018. Car-Brake: Geo. F. Renouf, Battle Creek, Mich. Filed Mar. 16, 1883.

279,049. Car-Starter: Emil Utz, Halstead, Kans. Filed March 26, 1883.

279,059. Car-Coupling: Charles Weik, Jr., Bristol, Pa. Filed Dec. 21, 1882.

279,062. Refrigerator: James H. Wickes, East Rochester, N. Y. Filed April 7, 1883.

279,072. Signal Head-Light: William Armstrong, Martinsburg, W. Va., assignor of one-half to David M. Newbold, Baltimore, Md. Filed Nov. 7, 1882.

279,084. Railway Time-Signal: Henry H. Eatherton, Monticello, Ill., assignor of one-half to A. C. Thompson, same place. Filed March 22, 1883.

279,088. Spring-Washer for Locking Nuts: Thomas M. Erwin, Verona, assignor of one-fourth to Edward Fried, Allegheny City, Pa. Filed May 4, 1883.

279,092. Track-Laying Device: Jno. M. Goodwin, Sharpsville, Pa. Filed June 5, 1882.

279,102. Locomotive: Daniel R. Murphy, Newark, assignor of one-half to Gurdon B. Johnson, Granville, Ohio. Filed Jan. 2, 1883.

BEARING DATE JUNE 12, 1883.

279,121. Car-Coupling: Jacob N. Best, Denver, Colo., assignor to the Best Car Coupler Company, same place. Filed March 12, 1883.

279,136. Automatic Car-Brake: Jacob David, Brooklyn, N. Y., assignor of one-half to Edward A. Deveau, same place. Filed Oct. 24, 1882.

279,137. Sleeping-Car Berth: Adolphus Davis, Montreal, Quebec, Canada. Filed Nov. 1, 1882.

279,162. Stock-Car: Henry C. Hicks, Minneapolis, Minn. Filed Oct. 7, 1882.

279,163. Refrigerating-Car: Frederick C. Hills, Newton, Mass. Filed Jan. 2, 1883.

279,185. Car-Truck: Patrick Reilly, Mattoon, Ill. Filed March 16, 1883.

279,201. Car-Coupling: Isaac L. Stover, Centralia, Ill. Filed April 9, 1883.

279,217. Car-Coupling: Levi I. Bodenhamer, Kernersville, N. C. Filed Aug. 21, 1882.

279,225. Automatic Railway-Alarm: Frank Clifford, Carson City, Nev. Filed June 3 1882.

279,229. Car-Coupling: John H. Depew, Peekskill, N. Y., assignor to himself, James Depew, and James C. Acker, same place. Filed Nov. 29, 1882.

279,255. Grain-Car Door: Frederick L. Kirkbride, Wyandotte, Kans., assignor of two-thirds to Robert H. Drennon and William C. Duvall, both of Kansas City, Mo. Filed March 27, 1883.

279,267. Coupling for Bell-Cords, etc.: George W. Nock, Philadelphia, Pa. Filed Feb. 24, 1883.

279,280. Permanent Way for Railways: Fridolf Schauman, Landskrona, Sweden. Filed Sept. 22, 1882.

279,281. Car-Coupling: Samuel H. Scott and George J. Talmage, Chanute, Kans. Filed March 19, 1883.

279,292. Apparatus for Recording Speed of Trains on Railway-Bridges: Jan H. M. Waldorp, Nymwegen, Holland. Filed April 10, 1882. Patented in France Feb. 23, 1882, No. 147,522; in Belgium Feb. 24, 1882, No. 57,154; in England March 1, 1882, No. 990, and in Germany March 10, 1882, No. 20,401.

279,299. Nut-Lock: James Wilkes, Winnipeg, Manitoba, Canada. Filed Mar. 9, 1883.

279,303. Car-Coupling: John Wood, Cooperstown, N. Y. Filed April 27, 1883.

279,307. Car-Coupling: Thomas H. Ambrose, Port Hope, Ontario, Canada. Filed March 5, 1883.

279,311. Railway-Car: Charles F. Annan, Boston, Mass. Filed Oct. 5, 1882.

279,312. Car-Coupling: Charles E. Appell, Harrisburg, Texas. Filed March 20, 1883.

279,317. Car-Coupling: James Barrett, Beallsville, Ohio, assignor of a part to Benjamin Dennie, same place. Filed Aug. 16, 1882.

279,321. Car-Coupling: Henry C. Bradley, Camden Point, Mo. Filed April 19, 1883.

279,332. Car-Coupling: George A. Cage, Mineola, Texas. Filed Oct. 30, 1882.

279,338. Steam-Cock and Check-Valve: Jos. A. I. Claudon, Paola, Kans. Filed Dec. 23, 1882.

279,342. Car-Axle Box: Chas. W. Coller, Hannibal, Mo. Filed April 19, 1883.

279,358. Stock-Car: John Dixey, Michigan City, Ind. Filed April 16, 1883.

279,361. Dumping-Car: Charles C. Duffy, Newport News, Va. Filed Nov. 9, 1882.

279,383. Feed-Water Heater for Locomotives: Henry Heaton, Cleveland, Ohio. Filed Feb. 13, 1883.

279,394. Machine for Curving Railroad Rails: William E. Kichline, Bethlehem, Pa., assignor of one-half to Doctor Abraham Stout, same place. Filed Mar. 16, 1882.

279,407. Pumping-Engine: Edwin H. Martin, Cleveland, Ohio. Filed April 19, 1883.

279,416. Car-Coupling: Hermon Moon, Grove City, Pa. Filed May 1, 1883.

279,420. Weather and Fire Strip for Box-Car Doors: George B. Nichols, Galveston, Tex. Filed Oct. 20, 1882.

279,434. Car-Truck: Horace Resley, Cumberland, Md. Filed April 30, 1883.

279,436. Station-Indicator: George Francis Robertson, Taylorsville, Ky. Filed March 17, 1883.

279,463. Railway-Signal: John S. Trites, Moncton, New Brunswick, Canada. Filed March 24, 1883. Patented in Canada Feb. 2, 1883, No. 16,248.

279,466. Car-Wheel: Nathan Washburn, Allston, Mass. Filed April 23, 1883.

279,478. Station-Indicator: Edward S. Boynton, Bridgeport, Conn. Filed March 2, 1883.

279,485. Car-Coupling: Elias C. Galentine, Bourbon, Ind., assignor of one-half to Thomas B. Lee, same place, and Dwight L. Dickinson, Plymouth, Ind. Filed March 29, 1883.

279,486. Heater: Robert Johnson and John F. Buerkel, Boston, Mass., assignors to the Johnson Railway Heater Company, same place. Filed Sept. 28, 1882.

279,506. Car-Axle Box: George W. Sweeney, New York, N. Y., assignor to James Augustus Hamilton, for himself and as Trustee, same place. Filed April 7, 1883.

279,509. Railway-Switch: Frank Vanell, Vincennes, Ind. Filed Feb. 24, 1883.

BEARING DATE JUNE 19, 1883.

279,520. Car-Wheel Chill: Jacob N. Barr, Altoona, Pa. Filed March 8, 1881.
279,544. Slide-Valve for Compound Engines: Edward G. Davis, St. Louis, Mo. Filed April 19, 1883.
279,565. Hand-Brake for Cars: Theodore Hunt, St. Louis, Mo. Filed May 10, 1883.
279,578. Device for Unloading Platform-Cars: George P. Merrill, Toledo, Ohio. Filed May 3, 1883.
279,614. Car-Coupling: Benjamin F. Teal, Paterson, N. J. Filed May 3, 1883.
279,654. Car-Coupling: William H. Lucan, Hermon, Ill. Filed Jan. 19, 1883.
279,658. Car-Coupling: De Witt C. McCallum, Minneapolis, Minn. Filed Nov. 10, 1882.
279,672. Stock-Gate for Railroads: Edgar H. Taylor, Ash Valley, Kans. Filed July 6, 1882.
279,675. Car-Coupling: Samuel G. A. Urquhart, San Francisco, Cal. Filed Feb. 27, 1883.
279,700. Safety-Guard for Railways: Barnad Briody, Detroit, Mich. Filed Feb. 15, 1883.
279,723. Railway Time-Recorder: Albert H. Dean and Stiles H. Whiting, Bridgeport, Conn.; assignors of one-third to Charles A. Gerdenier, same place. Filed Jan. 30, 1883.
279,732. Car-Door Lock: Joseph H. Fisher, Deerfield, Ill. Filed Feb. 27, 1883.
279,736. Rail-Spike: Hervey W. Fowler, Chicago, Ill. Filed Jan. 10, 1883.
279,752. Car-Coupling: William H. Heaverin, St. Louis, Mo., assignor of five-eighths to William H. Calvert and William S. Burroughs, same place. Filed March 16, 1883.
279,763. Car-Coupling: Charles A. Huth, Maynard, Ohio. Filed March 20, 1883.
279,791. Railway-Car: Joseph Parkinson, Danville, Va. Filed April 27, 1883.
279,800. Car-Coupling: Joseph Francis Pryor, Houghton, Mich. Filed Mar. 14, 1883.
279,821. Revolving Car-Signal: Leander W. Schoonover and Joseph Afflerbach, Perth Amboy, N. J. Filed March 13, 1883.
279,831. Link-Protector: Andrew V. Smith, San Francisco, Cal. Filed April 10, 1883.
279,845. Car-Coupling: John D. Vance, Cincinnati, Ohio, assignor of one-half to John J. Le Beau, same place. Filed May 4, 1883.
279,849. Safety-Guard for Railway-Frogs: Jean F. Webb, Lebanon, Ill. Filed Dec. 11, 1882.
279,868. Machine for Unloading Railroad-Cars: Almon Hall, Toledo, Ohio, assignor of one-half to Hosea T. Stock, same place. Filed April 27, 1883.

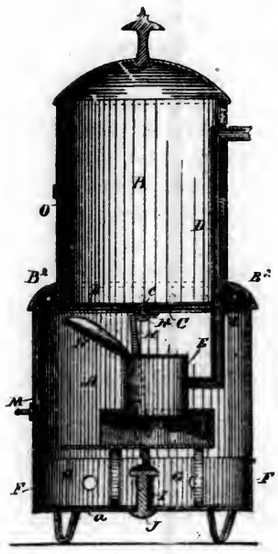
BEARING DATE JUNE 26, 1883.

279,907. Car-Spring: John B. N. Berry, Baltimore, Md. Filed Nov. 1, 1882.
279,911. Car-Coupling: Stephen M. Cate and Charles O. Smith, Bridgeport, Conn. Filed April 2, 1883.
279,914. Car-Brake: Moses M. Clark, New Haven, Conn. Filed Feb. 6, 1883.
279,920. Steam-Boiler: John A. M. Cox, Indianapolis, Ind. Filed Oct. 9, 1882.
279,921. Reversing-Valve: Charles S. Crane, Chicago, Ill. Filed Jan. 23, 1883.
279,924. Bed-Plate for Steam-Engines: John H. Elward, Polo, Ill., assignor to Mary Elward, same place. Filed Oct. 31, 1882.
279,929. Electric Railway-Signal: De Witt C. Farrington, Lowell, Mass. Filed June 5, 1882.
279,950. Construction-Car: Luther K. Jewett, Fitchburg, Mass. Filed Mar. 9, 1883.
279,951. Car-Truck: Luther K. Jewett, Fitchburg, Mass. Filed Oct. 19, 1882.
279,954. Sleeping-Car: Eugene P. Kellogg, New York, N. Y. Filed March 15, 1882. Renewed Nov. 1, 1882.
279,969. Coal-Burning Furnace: Arthur G. Moore, Winton Place, and John W. Rahn, Cincinnati, Ohio. Filed Jan. 17, 1882.
279,999. Car-Brake and Starter: Edmund B. West, Philadelphia, Pa. Filed May 15, 1883.
280,011. Valve Mechanism: John W. Bradley, Stratford, assignor of one-half to the Belknap Manufacturing Company, Bridgeport, Conn. Filed Jan. 23, 1883.
280,016. Car-Coupling: James B. Davis, Washington, D. C. Filed May 8, 1883.
280,027. Rotary Engine: Charles C. Garcelon and William A. Woods, Santa Cruz, Cal. Filed April 21, 1883.
280,029. Oiler for Machinery: Frederick A. Gardner, Buffalo, N. Y., assignor of one-half to R. Dunbar & Son, same place. Filed March 30, 1883.
280,030. Railroad-Rail Cushion and Joint: William F. Gould, Stuart, Iowa. Filed Aug. 4, 1882.
280,038. Packing for Pistons and Plungers: William D. Hooker, St. Louis, Mo. Filed Aug. 29, 1882.
280,041. Revolving-Cylinder Engine: George W. Hunter, Philadelphia, Pa. Filed March 29, 1883.
280,042. Steam-Engine Governor: Samuel E. Jarvis, Lansing, Mich. Filed April 3, 1883.
280,046. Electrical Pilot-Car for Locomotives: Smith H. Knapp and Alpheus E. Adams, Danbury, Conn. Filed Feb. 5, 1883.
280,049. Railroad and Other Ticket Holder and Press: John Loudon, Big Rapids, Mich. Filed Nov. 25, 1882.
280,064. Spark-Arrester: Alexander Mitchell, Wilkesbarre, Pa. Filed May 12, 1883.
280,083. Gas-Engine: Christian Rohn, Hartford, Conn. Filed March 8, 1883.
280,086. Car-Seal: William Scharnweber, Jefferson, assignor of one-half to Frederick K. Bowes, Chicago, Ill. Filed Aug. 26, 1882.
280,087. Car-Axle Box: John Schmelter, Detroit, Mich., assignor of one-fourth to Matthew Stolz, same place. Filed Jan, 31, 1883.
280,091. Chain Driving-Gear for Locomotives, Steamboats, etc.: Gustav F. Sievern, Pittsburgh, Pa. Filed May 2, 1883.
280,096. Balance-Wheel: John B. Tibbits, Hoosick, N. Y. Filed Feb. 3, 1883.
280,103. Cut-Off-Valve Gear: Alexander F. Ward, Detroit, Mich. Filed March 10, 1883.
280,106. Force-Pump: Milo L. G. Wheeler, Oregon City, Oregon. Filed July 17, 1882.
280,110. Metallic Railway-Tie: Sidney B. Wright, Wyandotte, Mich. Filed Dec. 23, 1882.
280,129. Car-Step: Arthur Cameron, Kalamazoo, and Charles E. Russell, Grand Rapids, Mich. Filed April 16, 1883.
280,146. Cutter and Holder for Lathes: Jos. W. Douglas, Middletown, Conn. Filed March 24, 1883.
280,162. Rotary Engine: Moses Fay, Townville, Pa. Filed April 21, 1883.
280,176. Gauge-Cock: Campbell P. Higgins, Philadelphia, Pa. Filed Feb. 5, 1883.
280,179. Car-Signal: Louis C. Huber, Huber, Ky. Filed March 19, 1883.
280,186. Belt-Coupling: Abner Johnston, Cornwall, assignor of two-thirds to Nelson Secor, New York, N. Y. Filed May 9, 1883.
280,188. Coupling for Shafting: John Killip, Allegheny, assignor to Bair & Gazzam, Pittsburgh, Pa. Filed March 5, 1883.
280,194. Rotary Engine: Andrew B. Lipsey, West Hoboken, N. J., assignor to William Bell, New York, N. Y. Filed June 10, 1882.
280,200. Railway Cross-Tie: John Mahoney and David W. Shockley, Wilmington, Del. Filed March 2, 1883.
280,206. Spark-Arrester for Locomotives: Theodore J. McMinn, St. Louis, Mo. Filed Nov. 15, 1882.
280,211. Lathe: Frederick B. Miles, Philadelphia, Pa. Filed Jan. 8, 1883.
280,212. Condenser for Steam-Pumps: William A. Miles, Copake Iron Works, N. Y. Filed Dec. 26, 1882.
280,223. Metallic Shield for Brakemen's Boots: Edward Nelson and Alfred Davis, St. Paul, Minn. Filed April 28, 1883.
280,224. Refrigerator-Car: Peter C. Nissen, Chicago, Ill. Filed April 9, 1883.
280,228. Pulley: Olaf R. Olsen, Indianapolis, Ind., assignor to the Indianapolis Machine and Bolt Works, same place. Filed May 21, 1883.
280,244. Car-Brake: John W. Rice, Springfield, Mass. Filed March 2, 1883.
280,254. Car-Coupling: David E. Southwick, Ogdensburg, N. Y. Filed Jan. 8, 1883.
280,255. Car-Brake: Oscar Spiess, Philadelphia, Pa. Filed April 23, 1883.
280,256. Steam-Engine Indicator: Ladislav Stanek, Prague, Bohemia, Austria-Hungary, assignor to the American Steam Gauge Company, Boston, Mass. Filed March 15, 1883.
280,259. Lathe: Frank M. Stevens and Charles E. Moore, Boston, Mass.; said Moore assignor to said Stevens. Filed Jan. 4, 1883.
280,265. Car-Axle Lubricator: Samuel J. Wallace, Keokuk, Iowa. Filed Mar. 9, 1883.
280,276. Belt-Tightener: James Withington, Chambersburg, assignor to the Trenton Iron Company, Trenton, N. J. Filed March 16, 1883.
280,277. Compound Packing for Hot Journals on Cars, etc.; Madison L. Woodbury, St. Albans, Vt. Filed April 4, 1883.
280,280. Railway-Car: William H. H. Young, Baltimore, Md. Filed Nov. 7, 1882.
280,282. Roller for Endless Belts: Reuben S. Bacon, Springfield, Ohio, assignor of one-half to Edgar J. Pelton, same place. Filed April 21, 1883.
280,307. Railroad-Gate: Geo. A. Hall, Waterford, and Geo. S. Fogg, Westbrook, Me., said Fogg assignor to said Hall. Filed Dec. 15, 1881.
280,311. Valve-Gear for Steam-Engines: Nathaniel G. Herreshoff, Bristol, R. I., assignor to the Herreshoff Manufacturing Company, of Rhode Island. Filed March 12, 1883.
280,312. Steam-Engine Valve: Nathaniel G. Herreshoff, Bristol, R. I., assignor to the Herreshoff Manufacturing Company, of Rhode Island. Filed Jan. 5, 1883.

THE printing of the new English dictionary, which is in preparation in London, has proceeded to the end of the article "alternate," and at that point there are over 6,000 entries, as compared with under 3,000 in Webster. The statisticians connected with the project have calculated that the work will contain nearly 200,000 entries, and that the quotations will reach more than a million in number. The first part of the undertaking will probably be ready for distribution in a few months.

Safety Casing for Railway Car Stoves.

BENJAMIN D. STEVENS, of Burlington, Vermont, has recently secured letters patent for a Safety Casing for Railway Car Stoves. This cut is an illustration of his invention.



The enormous yearly loss of life by burning consequent upon railroad accidents is appalling. The inquiry has been: Cannot something be devised that will save human life in case the car burns. The inventor has answered this question. Not only will his invention, if put into practical use, save human life, but it will also save the car from burning. The cost of one car burned to ashes that would otherwise in case of accident be at most partially injured, not beyond repair, would pay any railroad company for the whole expense incurred in casing their stoves with this device.

One life lost is worth more than it would cost to encase every railway stove in the country. Especially would it seem so to a railroad manager, if a member of his family were the victim.

Now the inventor has devised a simple remedy for all this. The casing can be used in connection with any ordinary car stove. It provides means for automatically closing the draft or air apertures in the event of an accident to the car, or in case of the upsetting or overturning, or tilting of the stove.

The casing is provided with bottom openings for the admission of cold air, and with top openings for the passage of the heated air into a radiator or shell surmounting the safety casing which surrounds the stove. A rotary disk or a sliding register is fitted on the apertured top of the safety casing, and is connected at the top with a spring pressed lever, the lower end of the lever being connected with a ring or band fitted over the air-inlet openings at the bottom of the casing, and provided with openings registering with those in the casing. A smoke-flue carried by the radiator or top shell extends through one of the openings in the top of the casing and connects with the funnel of the stove.

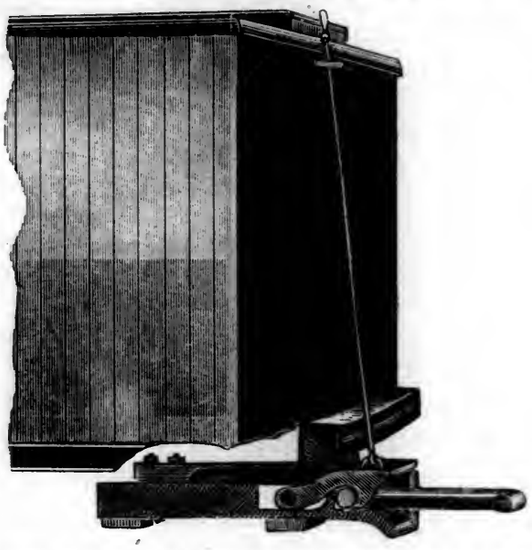
The radiator rests upon the safety casing in such a manner that the smoke-pipe of the former serves as a stop for keeping open the hot-air discharge openings in said casing, so long as the stove is in an upright position.

When the car or the stove is tilted or overturned, the radiator will topple off, and by the removal of its smoke-pipe from the pipe of the stove, bring into action the spring which is connected with the lever heretofore mentioned as being connected with the top rotary disk or sliding plate, and with the ring or band. The force exerted by the spring, serves to move the last named devices for closing all the apertures in the casing, consequently preventing the escape of fire and causing the latter to go out. The inclosure being thus made air tight, the fire is smothered and soon goes out. The radiator or shell called the drum, is composed of sheet metal, and it sets on a base composed of cast-iron or other heavy metal, the object being to have the radiator so heavy that it will rest firmly on the top of the casing, without the use of special fastenings, when the casing remain in an upright position, but as soon as the stove is tilted or overturned, or in the act of overturning, the radiator as before stated topples off and the casing closes up. No ordinary jar or tilting of the car in motion while remaining on the track, will affect the casing or its appliances in their relative positions to each other and the stove. But when the car is thrown from the track, tipped over or partially so, in such a manner as to throw the fire out of the stove, then it is that the radiator topples off, the casing is closed and this device becomes operative.

The casing is constructed of boiler or wrought iron, a material that will not break from receiving blows on its surface, and the apertured top is fitted to the body of the casing by bolts, rivets or other fastenings, so as to admit the stove. The casing may be cylindrical or of any other shape, according as the stove is which it is to cover, and may be made whole or in sections, in which latter case, the parts may be bolted together when the stove is encased; the bottom being close or solid and secured to the floor of the car. A door is placed in the casing, and appropriate means provided for feeding and cleaning the stove, the door being provided with a secure spring lock. All this can be handsomely ornamented and made a neat and pretty article of car furniture. The owners of this valuable patent are the inventor, Giles S. Appleton, and Hamilton S. Peck, of Burlington, Vermont. Correspondence solicited. Address Hamilton S. Peck, Burlington, Vermont.

The Mignauth Car-Coupling.

THE Mignauth Car-Coupling is automatic. A link is engaged and held by a downwardly swinging hook pivoted within the draw-head. The draw-head consists of a longitudinal bar having



its forward end made of flaring form, with a socket to admit one end of an ordinary coupling-link. The head contains in its interior an elevated shoulder, designed to limit the entrance of the link, and prevent it from being carried into the head too far. The opening into which the link fits, is made to retain it in a horizontal position, the upper surface of the opening bearing on top of the link at its inner end. The coupling-hook, which is seated in a longitudinal slot or mortise in the upper side of the coupling-head, is secured within the head upon a horizontal pivot, so that its forward end swings vertically. The forward end of the hook is beveled on the under side, so that it is raised by the action of the coupling-link, as the latter is forced into the draw-head. The nose or shoulder of the hook has its under side rounded to engage the more firmly with the coupling-head, and prevent the hook from working upward, and being disengaged by the vibratory motion of the link within the head, when the car is in motion. The parts are so constructed that the link is held securely in position and prevented from unnecessary end motion. For the purpose of insuring the action of the hook and preventing its accidental disengagement from the link, the inventor applies to the top of the hook a long flat spring, one end of which is secured firmly to the head, while the opposite and forward end bears upon the hook. The hook can be made to be operated from the top of the car, and the necessity of the attendant passing between the car can be avoided, by extending a

rod from the hook upward, through an eye or guide on the end of the car. The mouth of the draw-head and the hook are made so that the hook will certainly enter the draw-head of the next car, when the coupling of the two is to be effected.

Messrs. Mignauth and Bourbonniere, of Lawrence, Mass., are the proprietors of the coupling described.

Artificial Railroad Ties.

A new patent just taken out relates to the manufacture of railroad ties from the fibrous residue of the sugar-cane. The sugar-cane contains a very strong fiber, which becomes almost imperishable when freed from the many injurious agents which we naturally find with it.

The saccharine juice which alone renders the sugar-cane so profitable to the planter, is ordinarily extracted by means of rollers. But by no means does the planter succeed in getting even a fair percentage of the juice, which is contained in the cellular tissue of the sugar-cane. The linings or walls of the cells form what is known as the pith. This pith acts like a sponge, and retains a part of the juice after the cane has been subjected to the crushing pressure of the rollers. It is a well-known fact that, in order to obtain any liquid held in a sponge, if a continued pressure be applied, the result is much more satisfactory than if the pressure be momentary, as is the case with the rollers.

In this new process, the bagasse or fibrous residue is taken and so arranged in a press that the juices which remain, are extracted almost entirely by a continued great pressure. The form into which it is pressed is that of a railroad tie; the proper amount having been placed in the press to render the tie of the most desirable weight and shape. It may be necessary to treat the material chemically before the final pressure is applied; 1st. To prevent the saccharine matter from turning into an acid, which can be done by any neutralizing agent; 2. Perhaps to remove the mucilaginous or waxy matters which may come in as an injurious element, when we consider that the durability of this article is the chief factor which will render it of any practical use. The juice we obtain by this last pressure, may or may not be of any value to the sugar maker. Some claim that it will contain too many impurities to be made even into syrup. But experiment may prove that this is a mistake.

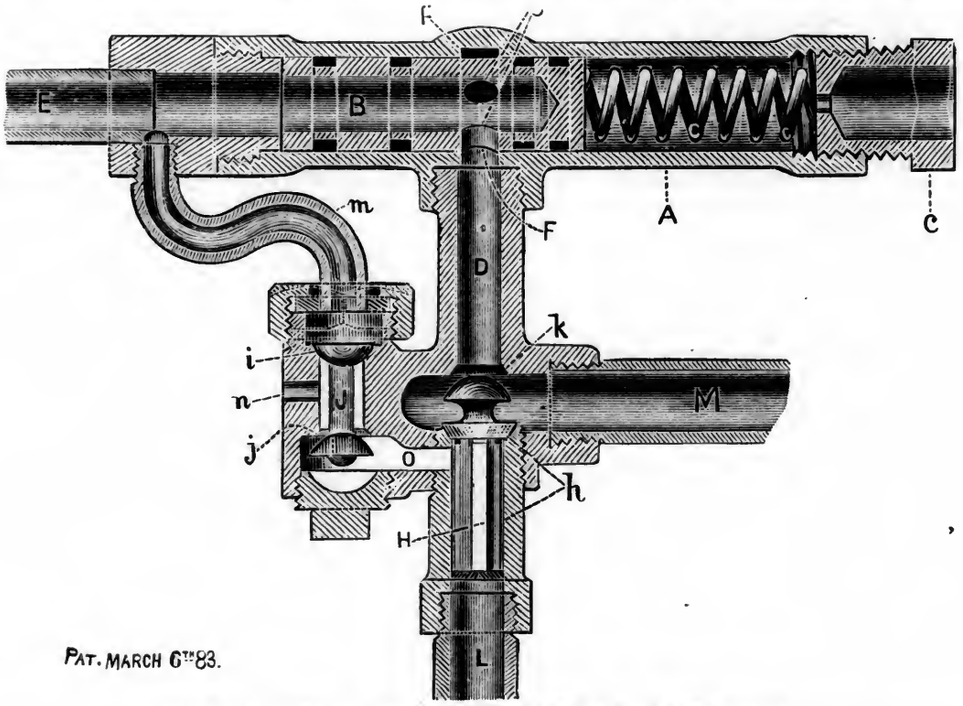
A New Automatic Pressure Governor and Brake Valve.

The accompanying engraving illustrates a recent invention in the line of Pressure Regulators or Governors, lately patented by Mr. George B. Price, of Philadelphia.

The design as shown entire has a special application to pressure air brakes, such as the Westinghouse Automatic. The invention, however, is really divisible into two parts, since part of it may be used without reference to the other.

In order to greater clearness, we will first describe that portion termed strictly the Governor or Reducing Valve, being all that part above the pipe D, the purpose of which is to reduce a constantly changing pressure to a uniformity; that is to maintain a constant prescribed pressure at the outlet E regardless of the excess at D.

It will be seen that this part of the design has reference to a number of cases, being applicable in fact to almost every arrangement where a reduction of pressure is desired, whether of air, gas or steam. The governor, which has a special claim to simplicity and few parts, consists of a cylinder A, into which is nicely fitted a sliding piston valve B; a spring C held in tension by the adjusting cap c, and the necessary pipe connections as at D and E.



PRICE'S AUTOMATIC PRESSURE GOVERNOR AND BRAKE VALVE.

The operation is as follows: Pressure in excess of that to be used is admitted at D; passing through the port and openings at F and G, it enters the hollow of the piston B, and thence to the outlet E; but as soon as the pressure at E equals the tension of the spring C, it forces the piston B back over the ingress port F, so diminishing the supply until the pressure at E has decreased sufficiently for the spring C to further open the ports and so keep up the desired supply.

The remaining mechanism, which is shown in combination with the governor, applies, as before stated, to Pressure Air Brakes. Imagine one of these combinations placed beneath each car in a train. L connects with the main supply pipe; M with an auxiliary reservoir, and E with a brake cylinder. When air is forced back through the supply pipe, it raises the valve H, closing it against its upper seat k, and passing through M charges the reservoir. At the same time, passing into the little chamber o, it lifts the pop-valve J, closing it against its lower seat j. These conditions hold until the pressure is released from L, either by a break in the train or intentionally, when the pres-

sure confined at M, operating on the larger surface of the valve H, closes it against its lower seat h, which opens a passage through D into the governor A, where it is brought to the most desirable pressure; thence to the brake cylinder at E, thus applying the brakes. At the same time the pop-valve J is closed against its upper seat i, by the pressure now in the pipe m.

When the brakes are to be released, pressure is again forced through L, acting as before described, recharging the auxiliary reservoir, and raising the the pop-valve J, allowing the pressure confined in the brake cylinder to escape through the pipes E and m and the hole n into the atmosphere.

The mechanism as applied to brakes may be used without the governor A if preferred, in which case the full power confined at M will be exerted on the brake piston; but as this has several objections, as the locking of wheels for example, the interposition of the governor is recommended, by which an equable pressure is maintained, and a considerable surplus held in reserve to make up for leakage in the brake cylinder.

The Lightfoot Cattle Car.

THE main features of this device have been patented. Its inventor thinks that metal would be lighter than wood for the body of the car, and perhaps not much if any more expensive.

The frame of the car may be made of angle, T, or channel iron, of wood, or of both wood and iron. Cattle stand lengthwise of the car, head to head and tail to tail, three abreast and in tiers, or eighteen animals per car, leaving nearly three feet width to each. They stand in stalls, each one of which is secured in place by movable bars of wood fastened by mortise at one end and button and hinge at the other end. The cattle enter by six doors. The head ends of the stalls are close up to the height of the head. The bottom board, which may be stationary, is two inches above the floor and twelve inches wide, so as to prevent legs getting under or over in lying down.

Feeding and watering are effected by means of galvanized iron troughs, two feet wide at the top and running half way across the car. These are set low so as to allow the animal's head in a safe position, lying or standing over it. The troughs are connected with tank and food reservoirs, which can be made to run the whole length of the car, if so desired, and which can be supplied with sufficient for the needs of the animals before starting or *en route*. The floor up to the edge of the urinary in front, may be of wood to stand on, also wood under hind feet. Said urinary is of perfected cast-iron, of dish shape, about two inches deep and of twenty inches diameter. The receptable for manure is a cast-iron trough, two inches deep, eight or twelve inches wide and hung on hinges so as to be emptied thoroughly; and under it, to prevent the cattle getting their feet through, are half-inch round iron rods, two inches from center to center and allowing the manure to be discharged readily. This arrangement for disposing of the droppings of the animals, is supplied with faucets connected with the water tank, so as to be thoroughly cleanable. The doors at the two middle tiers of stalls open back to back, so as to form guides to animals going into their places, and to be out of the way. They are hung on heavy hinges and fastened shut by bars across the whole, set on heavy iron loops or pockets, one of them open at the top, for the bars to drop in easily and hold it securely. To protect the animals from severe cold or storms, the cars up to near the height of heads may be supplied with canvas hung on rollers, and drawn up or down as the comfort of the animals may require.

Standing longitudinally with the direction of motion the animal has the means of bracing himself on recovery from sudden starting and stopping of train, which he has not when standing across the line of motion, and hence, by the old method, is often thrown down and, being unable to recover, is trampled to death or injured as beef for the table.

The above, with slight verbal changes, is Mr. Lightfoot's plan as described by him and submitted to the Humane Association, in the year 1880. The inventor insists that if the comfort and condition of animals during transportation are objects of importance, the cattle must have room to lie down. Should it be objected that the car as described is too long for safety, one set of middle stalls can be omitted, reducing the number of animals carried to twelve, and the length of the car from forty-eight to thirty-two feet. He proposes as food for cattle during transportation, oats or cut feed, to be served through the conveyers from top of car. Water can be supplied in the same troughs through pipes connected with the water tank of the car. If found expedient the receptacles for manure might be dispensed with, allowing droppings to pass through the iron-rod intervals above described. Mr. Lightfoot's address is Media, Penn.

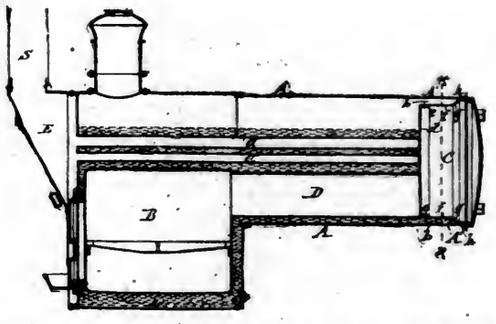
New Car-Brake.

CHARLES W. SMITH, of Coalesburg, Missouri, has invented a new specimen of that class of car-brakes in which the brakes are applied by the momentum of the cars. The letters patent granted to him secure him the combination, with a rigid axle-pinion, of a rotary shaft carrying a rigidly-attached pinion and lever, a chain connected with the brake mechanism, and a pinion journaled on one side of the lever, whereby the lifting of a lever will cause the brake mechanism to be applied; also the combination, with a windlass-chain and brake-lever, of a rod and cylinder containing a spring, said cylinder being pivoted at one end to a lever and suspended at the other flexibly from the car, whereby the brakes will be applied with a yielding pressure, and not by a sudden shock; and a brake consisting of three cog-wheels and a winding-shaft, in combination with a chain, rod, cushion-cylinder, brake-lever, rods, and lever, by which one cog-wheel is put in and out of gear with another cog-wheel.

G. A. Porter Steam Boiler.

PATENTED MARCH 6, 1883.

MANUFACTURED BY THE PORTER MANUFACTURING CO., LIMITED, SYRACUSE, N. Y.



THIS invention relates to that class of steam boilers which are termed "return-flue boilers." In such boilers the products of combustion pass from the furnace or fire-box, through a main direct flue, to the so-called "combustion-chamber" at the rear end of the boiler, and thence back through return-flues in the boiler to the smoke-box and stack on the front end of the boiler. The combustion-chamber of said boiler, especially when straw and other light fuel is used, is usually subjected to such intense heat as to necessitate the protection of its shell by a water-jacket surrounding the same. It is this water-jacket to which the invention has special reference, the object of the invention being to simplify and cheapen the construction, and at the same time give it a form which shall afford the maximum stability, and dispense with the use of stay-bolts heretofore employed for sustaining the crown-sheet of the combustion-chamber.

A, represents the shell of return-flue boiler ; B, the furnace or fire-box ; C, the combustion-chamber, communicating with the fire-box by the large direct flue D, extended longitudinally through the water-space of the boiler ; and E denotes the smoke-box, receiving the products of combustion from the combustion-chamber C, through return-flues a a, extended through the boiler in the usual manner, the stack S being mounted on the smoke-box for the escape of the products of combustion.

The steam and water jacket b, is formed around the combustion-chamber C in the following manner: The flue sheet d, is made of a smaller diameter than the interior of the boiler shell, so that when placed in its requisite concentric position in the shell it will be isolated therefrom, and with an opening around the edge of the flue sheet. The edge of the flue sheet is formed with the usual outward flange e, and on to the exterior of this flange is riveted a supplemental shell f, of cylindrical form, extended to the end of the shell and joined therewith by the flare g. By this construction is obtained the desired steam and water jacket b, around the combustion-chamber C, in a very simple and comparatively inexpensive manner, forming only two joints and seams of rivets, which are convenient of access for caulking and tightening.

Safety Doors for Cars.

Joseph Parkinson, of Danville, Virginia, has invented and patented what he believes to be an effective means of escape from a railway-car, other than the usual end doors. In the event of a collision between trains, the telescoping of the cars and the abutting timbers at their ends are liable to obstruct exit in the ordinary way ; and in the case of fire, the occupants frequently perish for want of some other ready means of egress. Mr. Parkinson's invention is intended to obviate these disadvantages. It consists in combining with one or more side doors, peculiar means for holding them normally closed and fastened, and for facilitating escape by such doors if the cars should be standing on a bridge or on a declivity. The side doors open anywhere in the length of the car. They open outwardly, and are hinged at the bottom, so as to drop down as a gang-plank. While not in use they are kept firmly closed against accidental opening and "chattering" from the vibration of the car. In case of accident, the doors can be lowered gradually without slamming, by means of ropes which are made long enough to assist passengers in descending from the car in case it should be standing in an elevated place, as on a bridge or over a ravine. The patentee claims the combination, with a railroad passenger car, of a side door having a screw-nut or socket therein, and a hinged plate or frame having a screw and hand wheel, or crank for securing the doors ; also the ropes, the uses of which are described above.

Mr. Parkinson's patent is dated June 19, 1883. Persons wishing fuller information than we have space to give, should write him for it.

The Phosphor-Bronze Smelting Co., Limited, of Philadelphia, are largely supplying phosphor-bronze as a substitute for iron, brass, copper, and German silver, in mining and marine pumps, and machinery for piston rods, valves and valve stems, bolts and nuts, wire-cloth, wire-ropes, etc. ; in electrical apparatus, for springs, screws, telephone and telegraph wire ; in sanitary appliances, locks, hinges, wood screws, machine screws, hardware, and all purposes wherein great strength and durability are desired. This alloy is described as unequaled among alloys for tensile strength, toughness, rigidity and resistance to crystallization and corrosion. It is made entirely without the use of easily corroded metals, such as zinc, and is found not to be affected by rapid deterioration from galvanic action when exposed to dampness or the corrosive action of sea air, sea and mine water, and other like influences.

Safety Guard for Railway Frogs, Etc.

Among letters patent newly issued at Washington, is one to Jean F. Webb, of Lebanon, Illinois, on account of his improvement in safety guards for railway frogs, etc. It consists, first, in slitting the guard, and, secondly, in providing it with a solid base. While it is not new to provide railway frogs, etc., with elastic safety guards, and to provide these with central longitudinal grooves, the inventor claims an elastic filling for said frogs, etc., having longitudinal slits to receive the flanges of the wheels; and an elastic filling, in combination with a solid base plate. An advantage of Mr. Webb's improvement, experienced in winter time, is in preventing the frog from getting packed solidly full of ice and snow. If snow get on it is easily swept off, and if sleet or rain form a crust over it, the moment a wheel strikes it, the rubber gives way beneath, and the ice is crushed to pieces.

James S. Bailey, of York, Penn., believes that he has one of the simplest and cheapest Car-Couplers ever invented and patented. It can be applied to most freight cars in use, and will accomplish coupling without the brakeman having to hold the link or drop the pin. He simply sets the combination. This takes but a few seconds and no attention is needed afterwards. The combination, including bolts to fasten on the drawhead, weighs about six and a half pounds. The hook for carrying link, and the holder for supporting pin, can be changed from one car to another. In case cars are of different heights, the pin-holder should always be on the highest car. There is no strain on any part of the combination, more than carrying link and pin. When the cars come together in making a coupling, the bolts slide back just enough to allow the face of drawhead to come together. In case of drawhead pulling out, there is nothing broken, as there is no part fastened to the body of the car. As to the cost of his patent, Mr. Bailey says that if companies would manufacture its parts themselves, it would be very small as compared with the cost of some now in use.

Improvements in the Canadian Patent Laws.

An amendment to the patent act has been recently passed in Canada, defining the duration of a patent to be fifteen years, subject to the payment of a government fee of $20 before the expiration of the first and second periods of five years. Patentees, however, have the option of paying the entire government fee for fifteen or for ten years before the issue of the patent.

This act, while not affecting the administration of the patent laws of the dominion, is a decided improvement. Formerly a patent was granted for five years, with the option of renewing or extending it for five or ten years more on payment of a fee of $20 for each five years. This had the effect that the United States court decided that the subsequent extension was a distinct and separate grant, and hence it shortened the life of the United States patent if issued subsequent to the grant of the Canadian patent, to the remainder of the five years of the life of the latter. Henceforth, each Canadian patent will be issued for fifteen years.

The patent office is also preparing a new form of patent, which will be less cumbersome than the old rather awkward and clumsy parchment. It will be modeled somewhat after the form and size of the United States patent, with certain improvements taken, it is understood, from the German pattern.

The business of the patent office at Ottawa is increasing from month to month, and is at present somewhat crowded, agents and patentees experiencing a good deal of delay in the allowance of their grants. Taken in all, there is yet plenty of room for improvement in the internal organization of the office, though it cannot be denied that progress is being made.

Chicago, Milwaukee and St. Paul Railway.

THE earnings of the Chicago, Milwaukee and St. Paul Railway Company for the years ending December 31, 1881 and 1882, were as follows:

	1881.	1882.
From freight	$11,884,795 53	$14,002,335 25
From passengers	3,938,988 77	5,179,078 04
From mail service	376,535 31	411,569 05
From express service	286,089 32	352,374 02
From news service	8,613 70	12,582 54
From rents	8,428 81	13,873 80
From telegraph	8,136 77	6,838 46
From extra baggage	26,046 55	38,034 91
From sleeping cars	105,625 53	141,670 74
From stock yards	63,387 26	73,545 37
From milk	31,313 35	36,852 18
From elevator "A"	77,564 77	17,357 97
From elevators "B" and "C"	104,709 19	30,313 45
From elevator "E"	71,283 44	43,014 79
From elevator, Minneapolis	34,943 36	27,285 29
Total earnings	$17,025,461 66	$20,386,725 86
Expenses, viz:		
Repairs of track	$1,542,590 51	$1,702,876 98
Repairs of bridges	184,428 78	285,850 25
Repairs of fences	67,093 72	65,075 51
Repairs of buildings	224,310 31	204,514 25
Repairs of locomotives	566,970 97	827,911 08
Repairs of cars	699,326 18	1,042,901 65
Repairs of tools and machinery	101,376 56	128,690 63
Renewal of track	341,370 04	221,112 30
Management and general officers	296,646 44	348,615 24
Foreign agency and advertising	111,008 04	181,356 45
Station service	1,388,650 64	1,677,599 53
Conductors, baggagemen and brakemen	724,473 27	937,156 62
Engineers, firemen and wipers	1,047,360 59	1,245,353 54
Train and station supplies	346,801 00	356,282 19
Fuel consumed	1,581,198 00	1,605,057 00
Oil and waste	173,687 24	228,222 37
Personal injuries	114,856 02	122,304 50
Damages to property	45,170 25	54,999 31
Loss and damage of freight and baggage	36,746 59	41,012 58
Legal expenses	53,714 37	70,441 24
New York office expenses	14,901 17	15,662 37
Taxes	473,166 43	589,613 80
Insurance	35,544 99	70,402 03
Miscellaneous expenses	65,367 33	93,609 05
Stock yard expenses	15,294 92	15,076 33
Expenses elevator "A"	21,193 14	10,324 33
Expenses elevators "B" and "C"	20,001 38	15,999 17
Expenses elevator "E"	19,453 54	18,710 73
Expenses elevator, Minneapolis	5,228 63	9,342 18
Total expenses	$10,317,931 14	$12,186,073 21
Net earnings	$6,707,530 52	$8,200,652 65

The entire net income of the company for the year ending December 31, 1881 (including $4,343,283.16 balance from previous year, $324,112.14 from interest and other income and profits, and $311,196.23 cash received for sales of land), was $11,686,122.05; and the disbursements were: for dividends on preferred and common stock, April 15 and October 15, 3½ per cent. each, $1,965,722.08, and for interest on bonds $4,127,389.12—leaving a balance December 31, 1881, of $5,593,010.85.

The entire net income for the year 1882 (including the $5,593,010.85 balance from 1881, $109,604 premium on bonds and stock, $38,358.04 dividend on St. Paul and Duluth Railroad stock, and $475,851.58 cash received for sales of land), was $14,417,477.12; and the disbursements were: for dividend on preferred and common stock, April 15 and October 16, 3½ per cent. each, $2,461,042.08, for interest on bonds $4,786.053.50, and for income applied toward payment for 71,019.48 shares common stock taken at par by shareholders *pro rata* in October, November and December, $3,550,974—leaving a balance December 31, 1882, of $3,619,407.54.

The length of road owned December 31, 1881, was 4,217 miles, and the average number of miles operated during the year, 3,830; at the close of the year 1882 the number of miles owned was 4,520, the average number of miles in operation having been 4,296—showing an increase in miles owned of 303, and in miles operated of 466.

At the close of the year 1881, (there having been added during the year, 103 locomotives and 3,398 cars of all descriptions) the company had 526 locomotives, 207 passenger, 27 sleeping, 6 parlor, 135 baggage, postal, mail and express, 11,036 box, freight and caboose, 1,419 stock, 4,286 flat and coal, and 32 wrecking and tool cars; and at the end of the year 1882 (100 locomotives and 5,258 cars having been added during the year), 626 locomotives, 240 passenger, 33 sleeping, 6 parlor, 6 dining, 176 baggage, postal, mail and express, 12,006 box freight and caboose, 2,364 stock, 4,154 flat and coal, and 33 wrecking and tool cars.

The number of miles run by passenger trains during the year 1882 was 4,495,232; by freight trains, 11,689,802; by wood and gravel trains, 2,120,287—total, 18,305,321, against 14,966,530 during the year 1881, an increase of 3,338,891.

The number of passengers carried in 1882 was 3,956,814, against 2,985,885 in 1881, an increase of 2,932,706; and the number carried one mile in 1882 was 200,790,926, against 137,940,086 in 1881, an increase of 62,850,840.

The number of tons of freight moved in 1882 was 5,127,767, against 4,276,088 in 1881, an increase of 851,679; and the number moved one mile in 1882 was 945,250,159, against 697,347,607 in 1881, an increase of 247,902,552.

The amount received per passenger per mile in 1882 was 2.58 cents, against 2.86 cents in 1881; and the amount received per ton per mile in 1882 was 1.48 cent, against 1.70 cent in 1881.

The earnings per mile run, on freight, in 1882 was $1.20, and in 1881 $1.22; do., on passengers, in 1882 $1.15, and in 1881 $1.13. The expenses per mile run, including all expenditures, was in 1882 $0.75, and in 1881 $0.78.

The gross earnings of the road for the year ending December 31, 1880, were $13,086,118.61, the total expenses $7,742,425.68, and the net earnings $5,343,692.93—showing an increase in the earnings of 1881 over those of 1880 of $3,939,343.05, with an increase in expenses of $2,575,505.46, making the increase in net earnings $1,363,837.59. Compared with the year 1881, the gross earnings of 1882 show an increase of $3,361,264.20, the total expenses an increase of $1,868,142.07, and the net earnings an increase of $1,493,122.13. The percentage of expenses to earnings was in 1881 60.6, and in 1882 59.8. The gross earnings per mile of road operated in 1881 were $4,445.29, and the net earnings $1,751.31; in 1882 the gross earnings per mile of road operated were $4,745.51, and the net earnings $1,908.90. The extraordinary expenditures during the year 1881 amounted to $4,744,569.38 against $4,978,286.17 during the year 1882.

During the year 1881 branches and extensions were constructed as follows:

In the State of Illinois a line from Rockton to Rockford, 16 miles; and the Braceville coal track, one mile.

In the State of Wisconsin, a line from Mazomanie on the Prairie du Chien division to Prairie du Sac, 10 miles; and from Monroe to Shullsburg, 34 miles.

In the Territory of Dakota, the Iowa and Dakota division was extended to the Missouri River at Chamberlain, 13 miles; the Southern Minnesota division from Dell Rapids to Sioux Falls, 19 miles; the Hastings and Dakota division west to Aberdeen, 30 miles, and thence up the James River north from Aberdeen 40 miles, and its Whetstone branch northwest from Millbank Junction, 11 miles. There were also constructed in the James River Valley, south from Aberdeen, 33 miles of track; and on the line west from Flandreau 22 miles from Madison to Howard City.

In the State of Iowa, a branch was constructed from the Iowa and Dakota division at Emmetsburg northwest 15 miles; and the Chicago and Pacific Western division was extended west towards Council Bluffs from Marion, 198 miles, leaving 64 miles of track to be laid.

The aggregate construction during the year amounted to 442 miles, which, added to the 3,775 miles previously owned by the company, made it the owner at the close of the year 1881 of 4,217 miles of completed road, of which 1,239 miles were laid with steel rails, 418 miles having been laid during the year. The average number of miles operated during the year, as previously stated, was 3,830.

During the year 1882, the Chicago and Pacific Western division was completed to Council Bluffs, 64 miles, making a continuous road 488 miles in length from Chicago to a connection with the

Union Pacific and other roads at the Missouri River. A branch was also constructed on the Iowa and Dakota division from Spencer to Lake Okoboji, 17 miles; and the Emmetsburg branch was extended 7 miles to Estherville. The Volga river branch of the Dubuque division was completed to West Union, the county seat of Fayette county, 14 miles. Of the line from Cedar Falls to Ottumwa, 2 miles were completed and 10 miles graded ready for the track. The narrow-gauge road, formerly owned by the Iowa Eastern Railroad Company, extending from Beulah, on the Iowa and Minnesota division, to Stulta, 15 miles, was purchased and changed to standard gauge. These add 119 miles to the company's lines in Iowa.

In Wisconsin, a branch was constructed from Brandon on the Northern division, to Markesan, 12 miles; and the railway of the Chippewa Valley and Superior Railway Company, extending from Wabasha, Minnesota, to Eau Claire, Wisconsin, 50 miles, including a bridge across the Mississippi River, with a branch from Red Cedar Junction to Cedar Falls, 21 miles, was purchased. These add 83 miles to the company's lines in Wisconsin.

In Illinois, a branch 3 miles in length was constructed from Galewood, on the Chicago and Pacific division, to Dunning.

In Minnesota, a branch was constructed from a point on the River division, near Hastings, to Stillwater, 25 miles; and a line from Northfield, on the Iowa and Minnesota division, to a point near Red Wing on the River division, 32 miles. These add 57 miles to the company's lines in Minnesota.

In Dakota, a road was constructed from Yankton, on the Sioux City and Dakota division, to Scotland, on the Running Water branch of the Iowa and Dakota division, 27 miles; and one from Mitchell, on the main line of the Iowa and Dakota division, north to Letcher, 14 miles. These increase the mileage in Dakota 41 miles; and make a total increase of 303 miles during the year 1882, which, added to the 4,217 miles owned by the company at the close of 1881, make it the owner of 4,520 miles of completed railway. As previously stated, the average number of miles operated during the year was 4,296.

The short pieces of road constructed in Dakota, from Yankton to Scotland and from Mitchell north, are in what is known as the James (or Dakota) River Valley, and are intended to form parts of the line of this company, extending north from Yankton through the same. During the year 1881 73 miles of this line were constructed from Ellendale to Ashton, and connect with the Hastings and Dakota line at Aberdeen. The distance from Ashton to Letcher is 75 miles, and from Mitchell to Scotland 45 miles. The construction of these two links would give the company a continuous line from Sioux City and Yankton through said valley to within 65 miles of the Northern Pacific Railroad.

During the year 1881 the preferred stock was increased $1,997,000 by the conversion of mortgage bonds into stock; and the common stock was increased $5,000,000, which was issued at par to the stockholders who subscribed for the same, making the total amount of capital stock at the end of that year $34,805,744. At the same date the amount of mortgage bonds (including $1,109,745 bonds of the Wisconsin Valley Railroad Company) was $80,168,745, making the total amount of stock and bonds $114,974,489, representing the entire cost of the property of the company, including the 4,217 miles of road, the rolling-stock, depot grounds, cattle yards, elevators, warehouses, docks and coal lands, being equal to $27,264 per mile.

The preferred stock of the company was increased during the year 1882 $2,046,000 by the conversion of mortgage bonds into preferred stock; and the common stock was increased $7,500,000, of which $7,101,948 was issued at par to the stockholders who subscribed for the same, one-half payable in cash and one-half charged to income account, making the total amount of capital stock at the close of that year $44,351,744. At the same time the mortgage bonds (including all liens on purchased roads) amounted to $89,635,500, making the total amount of stock and bonds $133,987,244, which represents the entire cost of the 4,520 miles of road, including rolling-stock, depot grounds, etc., being at the rate of $29,643 per mile of road.

The net receipts to the treasury of the company from sales of land during the years 1881 and 1882 were $1,224,364.38, and the amount now due to the company on contracts and mortgages, as shown in the annexed general account, is $1,787,508.90; in addition to which the sum of $210,000 is held in trust to abide the decision of a suit now pending on appeal in the U. S. Supreme Court.

The amount expended by the company during the year 1881 for real estate for yard, dock and depot purposes in Chicago, Milwaukee, Minneapolis, St. Paul and other points was $575,428.35; which amount was increased during the year 1882 by the sum of $259,320.03. The company have also purchased during the past two years 5,539 acres of coal lands in the States of Illinois and Iowa, at a total cost of $730,641.81. These mines furnished during the year 442,134 tons, being about two-thirds of the consumption for the year, and are deemed capable of yielding a full supply for all the requirements of the company.

GENERAL ACCOUNT, DECEMBER 31,

	1881.	1882.
Cost of road	$120,073,629 99	$137,631,949 12
Minnesota Midland Railway	381,122 63	383,150 38
St. Paul and Duluth Railroad stock	716,480 00	716,480 00
Illinois and Iowa coal lands	503,118 92	689,578 05
Minneapolis Eastern Railway	80,414 56	97,064 56
Milwaukee Land Company	.....	85,389 56
City of Hastings bonds	7,700 00	7,700 00
Clear Lake Park Association bonds	3,000 00	3,000 00
Council Bluffs Union Elevator stock	20,833 33	41,666 67
St. Paul Union Depot Company	41,425 00	51,600 00
St. Paul Warehouse and Elevator Company	21,006 00	21,006 00
Oshkosh & Mississippi River Railway bonds	209,598 53	.....
Hastings and Stillwater Railroad	201,443 20	.....
Stock of material on hand	1,028,763 99	1,495,112 82
Balances due from agents and other companies	315,244 68	226,986 62
Miscellaneous accounts (current balances)	347,396 27	345,137 82
Bills receivable	1,000 00	1,600 00
Bills receivable for sales of land	.....	1,787,508 90
Cash due on stock subscription	1,129,215 00	.....
Cash on hand	555,200 93	2,969,732 42
Total	$125,636,593 03	$146,554,662 92
Capital stock, preferred	$14,401,483 00	$16,447,483 00
Capital stock, common	20,404,261 00	27,904,261 00
Consolidated mortgage bonds	11,738,000 00	11,083,000 00
First mortgage La Crosse Division bonds	5,673,000 00	5,372,000 00
First mortgage Iowa and Minnesota Division bonds	3,431,000 00	3,201,000 00
First mortgage Prairie du Chien Div. bonds	3,674,000 00	3,674,000 00
Second " " " "	1,300,000 00	1,241,000 00
First mortgage Chicago and Milwaukee Div. bonds	2,494,000 00	2,393,000 00
First mortgage St. Paul (or River) Div. bonds	3,998,000 00	3,805,000 00
First mortgage Iowa and Dakota Div. bonds	558,000 00	541,000 00
First mortgage Iowa and Dakota Div. Extension bonds	3,814,000 00	3,505,000 00
First mortgage Hastings and Dakota Divison bonds	97,000 00	89,000 00
First mortgage Hastings and Dakota Division Extension bonds	5,290,000 00	5,290,000 00
First mortgage Southwestern Division bonds	4,000,000 00	4,000,000 00
First mortgage La Crosse and Davenport Div. bonds	2,500,000 00	2,500,000 00
First mortgage Chicago and Pacific Div. bonds	3,000,000 00	3,000,000 00
First mortgage Chicago and Pacific Western Division bonds	9,200,000 00	14,380,000 00
First mortgage Southern Minnesota Division bonds	7,203,000 00	7,432,000 00
First mortgage Mineral Point Division bonds	2,160,000 00	2,840,000 00
First mortgage Dubuque Division bonds	6,152,000 00	6,710,000 00
First mortgage Wisconsin Valley Div. bonds	1,700,000 00	1,700,000 00
First mortgage Wisconsin and Minnesota Div. bonds	.....	3,335,000 00
First mortgage Chicago and Lake Superior Division bonds	.....	1,360,000 00
Second mortgage bonds	387,000 00	1387,000 00
Land grant income bonds	352,000 00	318,000 00
Minnesota Central Railroad bonds	123,000 00	123,000 00
Milwaukee and Western Railroad bonds	215,000 00	215,000 00
Wisconsin Valley Railroad bonds	.....	1,106,500 00
Oshkosh & Mississippi River Railway bonds	.....	35,000 00
Land department	.....	1,787,508 90
Incumbrances assumed	6,755 00	6,755 00
Bills payable	2,490,397 40	2,712,038 48
Unpaid vouchers and pay-rolls	2,161,108 85	2,216,629 84
Miscellaneous accounts (current balances)	1,401,850 01	2,141,616 27
Dividends and interest unclaimed	118,726 92	83,162 89
Income account	5,593,010 85	3,619,407 54
Total, as above	$125,636,593 03	$146,554,662 92

The office of the company is at Milwaukee, Wis. The officers and directors are:

President—ALEX. MITCHELL.
Vice-President—JULIUS WADSWORTH.
Second Vice-Pres't—JAMES M. MCKINLAY.
Directors—Alex. Mitchell, Julius Wadsworth, Selah Chamberlain, Jeremiah Milbank, Abraham R. Van Nest, James T. Woodward, Wm. Rockefeller, Peter Geddes, Hugh T. Dickey, James Stillman, John Plankinton, S. S. Merrill, Jason C. Easton.
General Manager—S. S. MERRILL.
Secretary—P. M. MYERS.
Treasurer—R. D. JENNINGS.
Gen'l Pass. and Ticket Agent—A. V. H. CARPENTER.
Gen'l Freight Agent—A. C. BIRD.
Purchasing Agent—JOHN T. CROCKER.
General Superintendent—J. T. CLARK.

The Sawyer-Man System of Electric Lighting.

THE Consolidated Electric Light Company, which has its factory at 127 and 129 Front street, Brooklyn, N. Y., and its executive office in the Duncan Building, 11 Pine street, New York City, owner of the Sawyer and Man, and other patents, and of a system of electric lighting based thereon, has brought suits against the Edison Electric Light Company, the Brush-Swan Electric Light Company, the United States Electric Light Company, and all other leading electric light companies and some of their customers; in all, some eight or ten suits, for alleged infringement of patents owned by said company, and which, it claims, are the foundation of the whole system of electric lighting. This announcement is one of great interest to the whole public, and decisions in the suits brought will be awaited with anxiety. The patents owned by the Consolidated Electric Light Company are about sixty in number, but the foundation patents, it alleges, are only five or six in number, and cover inventions made by Wm. Edward Sawyer and Albon Man. The company was organized under the laws of the State of New York, on the eighth day of September, 1882. In March, 1883, it owned fifty-one patents, with other inventions of great value, not then patented, but with respect to which applications for patents have been made and allowed. Application for one patent is still pending, in interference with Mr. Thomas A. Edison.

AUTOMATIC CUT-OFF.

Among the patents owned by the company, is that on the Automatic Cut-off or Fusible Plug, invented by William E. Sawyer and Albon Man, embraced in patent No. 205,303, issued to them June 25th, 1878, and reissued 10,134, and of which the seventh claim reads as follows: "In an electric system, an electrical apparatus energized by the current flowing in such system, which, when there is an abnormal flow of current in a part or parts of such system, automatically operates to disrupt, disconnect, or change the circuit of such part or parts." This general description is sufficient to show that the invention meets the requirements made by the New York Board of Fire Underwriters, who, on the 12th of January, 1882, adopted the following rule: "Wherever a connection is made between a larger and a smaller conductor, at the entrance to or within a building, some approved automatic device must be introduced in the circuit of the smaller conductor, whereby it shall be intercepted whenever the current passing through it is in excess of its safe carrying capacity." It appears that Mr. Thomas A. Edison filed applications for a patent for the same invention, which were rejected because of the prior invention and patent to Sawyer and Man. The Consolidated Electric Light Company publishes, with documentary evidence to sustain it, the charge that notwithstanding this, the Edison, United States, Brush-Swan and other companies use the Sawyer and Man Safety Switch.

AUTOMATIC ELECTRIC SAFETY SWITCH.

Other violations of Sawyer and Man's patent, No. 205,303, issued June 25th, 1878, and reissue 10,134, are also alleged. This patent refers to a device called the Automatic Electric Safety Switch or Automatic Shunt, which throws out of circuit any arc light or incandescent lamp endangered by a too intense current of electro-motive force. The provision stated seems to be the only means whereby two or more lamps, arc or incandescent, can be commercially used in series. The Consolidated Electric Light Company alleges that thirty thousand violations of this patent are in existence. Similarly it is alleged that the Automatic Regulator, of Sawyer and Man, patent No. 205,305, issued June 25th, 1878, which automatically checks an excessive flow of current, is violated in no fewer than twelve hundred instances.

AUTOMATIC REGULATOR.

The Board of Fire Underwriters further require that, "Means by which those in charge of the dynamo electric machines will be warned of any excessive flow of current, or means whereby the same will be automatically checked, must in all cases be provided." The only practical mode of controlling an "excessive flow of current" is by an automatic check or regulator; for the human eye or hand cannot be warned in time to avoid a "lightning flash." This requirement is described as fully met by the Automatic Regulator invented by Sawyer and Man, for which patent No. 205,305 was issued to them June 25th, 1878. The said regulator operates not only to indicate and check the current automatically, but also to regulate the supply of steam or other power whereby the electric current is generated. These features of the system are covered by the patent last cited as follows: 1st. "In an electric regulator the combination of two paramagnetic parts, operating substantially as described." 2d. "In an electric lighting system, a generator of electricity, two or more electric lamps, supplied thereby, and an independent electro-magnetic switch or regulator, energized by the current from the generator and acting automatically, upon the occurrence of any change of electrical condition in the circuit or circuits supplied, to allow of corresponding change in the quantity or intensity of the current generated." This is a broad foundation patent, and is said to be infringed by the Brush Electrical Company, the Edison Electric Light Company, the United States Electric Lighting Company, and all others using an automatic magneto-electric governor or regulator for any of the purposes above described.

THE CARBON AND PROCESS OF TREATING CARBONS.

In the system of Incandescence Lighting, adopted, after much experiment, by the Consolidated Electric Light Company, a peculiar carbon is used, covered by certain letters patent, issued to Sawyer and Man, from June 18th, 1878, to June 29th, 1880. The object of the invention as specified and claimed in these patents is to manufacture a new carbon for incandescence electric lights, and the invention consists, 1st. In electrically heating the illuminating electrode to incandescence, in the presence of a hydrocarbon, which is thus decomposed, and the carbon of which, set free, becomes deposited upon, incorporated with, and permeates the incandescent electrode, producing a new and improved illuminating conductor composed of "consolidated carbon," created by electric action, thus changing the essential characteristics of the original carbon. 2d. In electrically heating the illuminating conductor and connections in the lamp to incandescence, in vacuo, or in the presence of an inert gas, after the conductor is put in the lamp, but before the lamp is finally sealed, for the purpose of "driving out all impurities and occluded gases" contained in the conductor or electrodes. This method of making and treating the illuminating conductor is broadly covered by the patents above recited, and is said to be infringed in either one or both processes by all of the companies engaged in the manufacture of incandescence electric lights.

THE LIGHTING SWITCH.

To prevent the carbon from becoming too suddenly heated, and to obviate the disturbing influence of great changes in resistance which accompany the lighting and extinguishing of a lamp, which often destroys the carbon, the Consolidated Electric Light Company will use the lighting switch or "lamp-lighter," invented and patented by Sawyer and Man, June 25th, 1878. It operates by gradually transferring the current from one closed circuit to another, the effect of which is to gradually illuminate or gradually extinguish the lamp as desired. This invention is broadly covered by this patent; is applicable to both arc and incandescence systems, and is said to be directly infringed by the other electric light companies.

LAMP CONNECTIONS.

The electrical connection between the lamp and the terminals of the conductors leading from the generator is specified and broadly claimed in patent No. 210,809, dated December 10th, 1878, issued to Sawyer and Man, which covers the means of electrically connecting the lamp with a chandelier or bracket. From personal examination of specimens of lamps used by other companies, and of the reports published in relation to them, a committee of the Consolidated Electric Light Company are of the opinion that there are at least 100,000 such connections used, each of which is an infringement of the above patent.

The incandescence and arc lamps and dynamo manufactured by the Consolidated Electric Light Company, have peculiarly excellent features. No less than $288,000 have been expended by it in preparation, now fully matured, to manufacture, and also to enforce its rights against all who are infringing its patents. The company, as we are informed, can afford to sell both the incandescence and arc light plants at a price far below the advertised price lists of other companies.

REPORT ON THE SAWYER-MAN SYSTEM, BY MR. WM. J. GREEN, ELECTRICIAN AT THE SMITHSONIAN INSTITUTE, WASHINGTON, D. C.

The following are extracts from a report made by Mr. Wm. J. Green, electrician at the Smithsonian Institute, on the Sawyer-Man system of electric lighting. They confirm in important particulars the statements made by the Consolidated Electric Light Company.

Speaking of the Fusible Plug he says: "This fusible wire cut-off is one of the simplest, cheapest and most reliable that can be used for the purpose specified." "The Edison Electric Light Company and United States Electric Light Company use the same device described in the patent granted to Sawyer and Man."

Of the Automatic Shunt he reports: "The claims of the Consolidated Electric Light Company to this automatic shunt are fully sustained by Patent 205,303 and Reissue 10,134." "The Brush Electric Light Company use a cut-off which acts as follows: When there is an abnormal resistance in the lamp, the current is shunted to a circuit which contains an electro-magnet, and the magnet receiving more than its normal current, attracts an armature which cuts the lamp to which it is attached out of circuit, without affecting the main line. It is the same device described in the above patent, and certainly an infringement of it." Again, "The United States Electric Light Company use a cut-off acting so that when, from any cause, there is too much resistance in the lamp the current is shunted to an electro-magnet, which, attracting an armature, closes the circuit of the lamp and thereby cuts it out without interrupting the main circuit." "I have no doubt, whatever, that both of the above companies infringe this patent."

The Automatic Regulator, described in Patent No. 205,305, issued to Sawyer and Man, is an Electro Magnetic Switch or Regulator, energized by the current from the generator and acting automatically upon the occurrence of any change of electrical condition in the circuit supplied, to allow of a corresponding change in the quantity or intensity of the current generated. The eminent electrician writes: "After careful investigation I am of the opinion that the Brush Electric Light Company infringe this patent; for they use a resistance acted upon automatically by an electro-magnet energized by the main current from the generator, to vary the intensity of the magnetic field in proportion to the current required for feeding the lamp circuit."

In a passage on the process of treating carbons, Mr. Green observes: "The process of treating carbons by nearly all manufacturers of incandescence lamps, and especially by the Edison Company, is to place the glass bulb containing the electrode in connection with a vacuum pump, which exhausts the air from the bulb, and at the same time the electrode is heated to a more or less degree of incandescence by the electric current, thereby expelling the air and other gases contained in the electrode (carbon and connections) giving it greater density and homogeneity. The bulb is then sealed. This process is described in the Sawyer and Man patents to be 'in electrically heating the illuminating conductor and connections in the lamp to incandescence in vacuo, or in the presence of an inert gas, after the conductor is put in the lamp, but before the lamp is finally sealed, for the purpose of driving out all impurities and occluded gases.' This process is essential to the production of an incandescence electrode in vacuo, and the companies which use said process infringe the patents of Sawyer and Man."

This report coming from so eminent an authority is entitled to much consideration, and the ownership of these patents by this company would seem to give to it the foundation upon which the whole fabric of electric lighting is based.

Projected Deep-Sea Lighthouses.

W. C. ANDERSON'S plan for founding deep-sea lighthouses received great attention at a recent meeting of the London Society of Engineers. It is to construct a hollow cylinder of riveted iron work, two hundred feet long, to consist of two sections; the upper part to be one hundred and forty feet long and fitted as an ordinary lighthouse, wholly out of the water, while the remaining portion of the tube is to be ballasted so as to sink below the water line and counteract the force of winds and waves on the exposed part. The whole apparatus is to be anchored in deep water by heavy steel cables. The inventor claims that it would be easy to tow such a structure to the spot selected for it, and then by admitting water to the lower section it would assume an upright position and ride the waves like a bottle. The idea of founding mid-ocean floating telegraph stations has long been discussed, but Mr. Anderson is the first to project a structure which would remain stationary, and if connected with the telegraph cables would not in stormy weather endanger them. Sir John Herschel ascertained that in case of a wave a quarter of a mile in breadth and forty feet in height, the displacement of the water at a depth of 1,320 feet, in its passage over it, would be less than an inch, and would be incapable of disturbing the smallest grain of land. As Atlantic waves seldom attain those dimensions, it seems to be approximately certain that the construction of a deep-sea floating station, which can be kept in place in all weathers, is not a difficulty too great for the advanced engineering of these days.

STEEL Belting is, according to report, now being made in Germany. The belts are made exclusively of steel wire, and are so constructed that they are flexible, easily fastened and may be tightened at pleasure. The pulley upon which the belting runs must be covered with leather or other suitable material for securing the necessary amount of adhesion. The belting is well adapted for heavy work, it is claimed, and is not affected by dampness or a change of temperature, as is leather.

The Chicago Exposition.

[From our own Correspondent.]

CHICAGO, June 23, 1883.

PUBLISHERS AMERICAN RAILROAD JOURNAL:

The great National Exposition of Railway Appliances is about to close, the earnest efforts made by the management to secure an extension of the original period of duration, namely, from May 24 to June 23, being futile, owing, it is said, to the rental of the Exposition Building by Theodore Thomas, and his refusal to forego his occupancy for a time. It is perhaps to be regretted that another two weeks cannot be given to the exhibitors and the public; and especially so as, owing to various causes, there was considerable delay in perfecting arrangements for the display of many exhibits; and from the further fact—strange as it may be—that in general the city Press was either so reticent or antagonistic as to Exposition interests, that public attention was not fairly drawn to the Exposition at all until, as has been the case, the positive superiority of the collective exhibits, as to number, values, and attractive arrangements became better known in consequence of visits made by the classes interested in such appliances, than by the accounts printed in the newspapers. During the latter days of the Exposition, the general public have been visitors, and the attendance and receipts correspondingly increased.

It may be justly said that the Exposition itself, as to its *utility*, and success in bringing together for inspection and test the multitudinous appliances in identity with railroad interests, has far surpassed the most sanguine hopes of its projectors, and has astonished the most practical and thoroughly posted of exhibitors and railroad men. "There are about fourteen hundred exhibitors, and almost ten times that number of exhibits, taking the various articles classified," said a leading official to your representative. (It required some ingenuity to classify some articles as strictly Railway Appliances, yet the emergency was met). In an interview with the secretary and an associate commissioner, your correspondent was told that when the scheme of the Exposition was decided upon, serious apprehension was felt by the projectors that the main Exposition Hall was far too large for the purpose, and predicted that it would be difficult to fill the building with appropriate exhibits. Yet the facts are, not only is this vast building closely occupied, but the management have been compelled to extend the limits, until acres of annex inclosure were found necessary to accommodate actual exhibitors. So much by way of general statement.

It is not surprising that among the competing interests represented, there should be cases of real or fancied grievance. Your representative was approached many times by various parties, and heard the charges of "favoritism," "inside rings," "extortion," etc., often reiterated; and he is free to say that from the complainants' stand-point, there was a show of justification. But there are, or should be, "two sides to the question." Feeling that the desire to be truly impartial is characteristic of the JOURNAL, an interview was had with the leading officials of the Exposition enterprise in order to hear their side of the story. From the facts these gentlemen presented in answer to the charges made against them and the unquestioned high character and integrity of his informants, the conclusion is forced, that the censures passed upon them are the result, in most instances, of misapprehension. While it is admitted that in the questions of juries, awards, etc., there may be ground for charges of "favoritism" and "incompetency;" in the main, even in these departments, the officials of the Exposition have endeavored to do fairly by all concerned.

To strengthen this view, it may be added that many exhibitors expressed the utmost satisfaction with the entire affair, the relations of most of whom preclude the idea that they were the subject of favoritism, etc. It is known to your correspondent that sales of machinery, royalties, patents, and various appliances of exhibitors were made at the Exposition, aggregating immense values. In many instances, also, but for this opportunity to get the critical attention of practical men, some articles of merit would have remained in obscurity; while here their worth has been appreciated, and success insured. In cases such as these, there is no complaint.

A fair criticism will justify the following views: 1. The enterprise had its inception in a two-fold plan, primarily to benefit the projectors and a certain circle in which the Pullman interests were no small factors; secondarily, to help competitive inventions. 2. The earnest, practical nature of the men whose coöperation was invoked wrought out results exceeding the narrow-minded original plan. The Exposition *as such* was a grand success. While credit is due to the originators for their inception of the idea and labor in its development, it may justly be stated that the idea developed beyond the conception of the originators. They were not fully equal to the emergency, but wisely called into operation other executive ability than their own, as witness the names of the president, Hon. Lucius Fairchild, A. G. Darwin, Esq., and the host of honorable names among the commissioners.

There will be another Railroad Exposition, and soon, perhaps, but not in Chicago. While the conviction seems justified that no considerable lapse of time can develop an exhibit much advanced above the almost perfection of applied machinery, workmanship, etc., exhibited at this, yet your correspondent dare not venture that view, as he looks upon the locomotive and cars of the days of George Stephenson and others of the pioneers, and then upon the splendid Brooks' locomotives, upon the superb day coaches exhibited by the Jackson & Sharp Co., and others, and the "sleepers" and "parlor" cars of other manufacturers. In other departments involving skill, promoting comfort, and marking advanced ideas, there were enough exhibits to impress one with the idea of the almost infinite capacity of the human intellect.

Part of the plan of your correspondent was to give in detail, interesting features of the exhibits. Two reasons, however, preclude this: The June JOURNAL was issued about date of his arrival (14th) at the Exposition. Its interest for circulation, therefore, in that direction, did not exist. And then, in the limits of one issue of the JOURNAL, a just and discriminating reference to the many articles of real value could not be made. Yet it is believed that the JOURNAL will be utilized hereafter by many whose acquaintance with it was made at the Exposition, and whose approval of its contents and spirit was pleasantly expressed. For the present, reference is omitted except as to the Electric Railway, which, in its equipment and perfect success, attracted great attention. The Exposition management being unable to induce any outside parties to incur the risk and expense incident to the construction of such an enterprise, the commissioners, to use their own words, took the matter in their own hands, and, out of the funds of the "Exposition Association, built and equipped this road, which is the first in America intended for business purposes." By the way, both the main building and annex were illuminated by electricity supplied by six different companies—the United States, the Brush, the Fuller, the Garden City, the American, and the Edison. Your correspondent can testify to the excellence of each, though he is under particular tribute to the United States Company, which furnished the Press department in that particular section in which his quarters were assigned. To say that the electric lighting system as a whole, was a success, is not enough; it was perfection. He believes that the date is near when trains in motion, depots, all public and private buildings, and highways will be lighted in a superior manner, and with economy, by this new and subtle agency; in fact, when the hand-lamp of the housewife will be provided with a miniature storage battery supplying light at the will of the user. The other forms of adaptation of the electric force in railway signals, especially as illus-

trated in the Hall system, of Meriden, Conn., may be referred to as valuable.

Attendant features of value during the Exposition, were conventions of the Association of General Superintendents; of the Master Car Builders' Association; of the Association of Railroad Telegraph Superintendents; of the Master Mechanics' Association; and the gathering of the members of the American Society of Civil Engineers. It would be a pleasure to report in full in this correspondence, the discussions of important questions among these several organizations of able and practical men, were it possible.

In concluding, it is due that earnest acknowledgments be made of the uniform courtesy with which the writer, as the representative of the AMERICAN RAILROAD JOURNAL, was at all times treated. To the Executive Management and Reception Committees of the Exposition, to the Master Car Builders' and the Master Mechanics' Associations, to the exhibitors, to various officials of railways, the writer desires to extend his acknowledgments. Being invested with the insignia-badge—"Guest: National Exposition of Railway Appliances, 1883"—was also a guarantee of recognition. A trip to Pullman, by invitation of the Master Mechanics' Association, and participation in the ceremonies of the opening of the Chicago and Atlantic Railway, the new Erie link connecting her through routes to the West, are among the pleasant incidents of this visit to the Chicago Exposition. E.

The Railroad Engineer.

IT is very evident that the whole course of an engineer's career is not as smooth as the track he runs over. They are supposed to exercise presence of mind, no matter what stares them in the face. The engineers on the Pennsylvania railroad receive $3.80 a day, or $115 a month. For instance, a round trip from the Broad street station to Jersey City and back, 182 miles, is considered a day's work. Every third day they have off. Some engineers get through their day's work in less time than others. For example, engineer Larrison leaves Broad street with the half-past seven o'clock express in the morning and gets back to Broad street at twenty minutes past two in the afternoon. He takes his engine out to Powelton avenue to the round-house, and then his day's work is done, and he is free until half-past seven the next morning. Every steam horse has a stall in the big round stable, and its "hostlers," as the men are called who take care of and clean the engines. Engineer Larrison gets off his engine much the same as a jockey gets off his sulky when the race is over. The hostlers take charge of the engine, which has become dirty and tired-looking from dashing over 182 miles of road-bed.

When you see an engineer who is running a passenger train, you can make up your mind that he has worked a long time on an engine before he reaches that important post. First, there are four or five years to be served as a fireman, and then several years on a freight train.

The engineers on the Pennsylvania road are carefully selected by the road foreman of engines, and no man known to drink liquor would be allowed to run an engine an hour. Not only is their life while on duty carefully scrutinized, but their movements while off duty are generally known by the officers. "A man must have the qualifications of a clear head and a steady hand," said an official to the reporter.

If the newspaper express is detained a single minute on the road, the conductor has to make out a detention report, stating where the detention occurred and the cause of it. As soon as the train arrives at Broad street, the report is telegraphed to Trainmaster Adams, at Jersey City, so that immediately after the train's arrival here, he knows exactly the whole history of its run. The train leaves Jersey City at 4:40 A. M., and the great disadvantage in making a fast run with it is that the engineer has not daylight to do it in, except in midsummer, and then it is often very foggy. Fog is an engineer's worst enemy. They dare not run so fast as in clear weather, and have to slow up frequently to see if the signals are all right. Rain makes the tracks more slippery than snow, and necessitates slowing up sooner on approaching a station, which means lost time. Snow always gives an engineer the blues, and next to fog is dreaded worse than anything else. Many engineers are particularly cheerful when they have a bright moon, and claim they can make better running time than without it, while many feel happy and contented with the company of a clear sky full of stars.

Some engineers handle a train more gracefully than others. Some stop a train gradually by applying the air and then allowing it to exhaust, repeating the manipulation two or three times, which stops the train by degrees and prevents the jerking of the cars, and shaking the passengers up, while other engineers, who have not the knack, stop the train frequently with one application of the air-brake.

Charles Dickens told a friend on alighting from a train during a visit to this country, that his first thought on stepping upon the platform was, "Thank God and the engineer." A close observer will notice that travelers seldom look at the engineer as they pass down the platform from the train when they have reached their journey's end.—*Ex.*

Coney Island.

BRIGHTON PIER THEATRE.

A CURIOSITY in the attractions of this celebrated watering place, is that the theatre with the above caption is built out into the sea, nearly a quarter of a mile, at the extreme end of the new iron pier. The enterprising manager is Mr. James Donaldson, Jr., of the London Theatre on the Bowery. This is an original conception of his, and he says that the old or constant visitor to the island needs just such a place, where he may be fanned by the ocean breezes and at the same time enjoy a first-class entertainment. We have found by experience that it is so.

MESSRS. PALLISER, PALLISER & Co., of Bridgeport, Ct., the well-known Architects and Publishers of standard works on architecture, have lately issued a sheet containing plans and specifications of a very tasteful modern eight-room cottage with tower, and also with the necessary modifications for building it without the tower, and with but six rooms if desired. In its most costly form, the outlay is estimated at $3,000; without the tower it has been built for $2,500; and if only six rooms are included, the cost may be reduced to $1,700 or $2,000. Details are given of mantels, stairs, doors and casings, cornices, etc. The publishers have found it the most popular plan they have ever issued, and state that it has been adopted in more than five hundred instances within their knowledge. The same firm issue Specifications in blank, adapted for frame or brick buildings of any cost; also forms of building contract, and several books on modern, inexpensive, artistic cottage plans which are of great practical value and convenience to everyone interested.

A PINE floor laid in a gold worker's shop in ten years becomes worth $150 per foot. A Syracuse jeweler once bought for less than $50 some sweepings that gave $208 worth of gold. A tub in his cellar, into which is blown the dust from a polishing lathe, accumulates $50 a year. A workman in his shop carried off on the tip of his moistened finger $30 of filings in a few weeks. Workmen sometimes oil their hair and then run their fingers through it, leaving a deposit of gold particles, which they afterward wash out.

"BRING me no more reports" unless written by one of those marvels of ease and comfort, one of Esterbrook's Pens.

Lost Rivers in the West.

About nine miles above the town, on the line of the old military road, the little Santa Cruz River disappears forever, working one of those strange phenomena so often found in this country—lost rivers. Old residents say that you can hear its rumbling under ground. It could, no doubt, be recovered. This furnishes a plain illustration of the truth of the theory so often broached of the existence all over the inter-mountain country, of subterranean streams, from which it is possible to secure what in this arid belt may be regarded as an ample supply of water. A friend predicts that it will not be ten years before the chief assults of the Eastern press on the corrupt and lavish expenditure for internal improvements will no longer be directed toward rivers and harbors, but that it will hinge upon a more or less comprehensive scheme for the preservation of water, the means of its distribution, the construction of reservoirs, and the recovery of lost rivers, with expensive plans of forestry; all of which my friend declares Congress will be considering, and the country east of the Mississippi opposing. The people here aver that one-half of this vast mountain table-land, which within the boundary of the United States may be roughly estimated at one thousand miles north and south and the same distance east and west, can, by the careful reclamation and preservation of the water to be found within it, be made entirely useful for agricultural and pastoral purposes.—*Arizona Letter to Ohio State Journal.*

Railway Travelers' Rights.

The courts have recently given the benefits of justice, in two notable cases, to railway passengers. These persons were traveling upon tickets which had been bought in the usual way, and they were violently ejected from railway trains by the conductors of one of the most powerful of our railway companies. The verdicts indicate once more that the traveler whose rights have been ignored upon railways, can look with confidence to the courts for fair treatment, and may reasonably expect to recover a round sum of money from the offending company.

The case of W. J. Connell, of Omaha, against the Pennsylvania Railroad Company has been tried twice, and at the end of each trial the plaintiff has recovered $15,000, which was all that he demanded. Mr. Connell came to Washington in 1880. Having made an argument before the Supreme Court he undertook to come to this city. He had come from the West upon an unlimited or stop-over ticket, which gave him transportation over the Baltimore and Ohio Road to Washington, and over the Pennsylvania Railroad from Washington to this city. Soon after leaving Philadelphia a conductor refused to honor his ticket, upon the ground that a conflict between the Baltimore and Ohio Company and the Pennsylvania Company, had led the last named company to discontinue the sale of tickets allowing a passenger to travel part of his way on one road and the remainder of his way on the other. Mr. Connell refused to pay any additional money, and was thrown from the train by several employés of the road. It appeared during the trials that the pooling arrangement had not been broken until after Mr. Connell had bought his ticket, and that the Pennsylvania Company had received its *pro rata* for the identical ticket which the conductor refused. The defense was so weak, that the only question for the jury to consider was whether the passenger's rights had been affected because he stopped over at Washington, although his ticket allowed him to do so. The jury gave the plaintiff $15,000, as has already been stated.

The other case was that of Frank Spicker, a salesman, who was traveling in 1881 between Williamsport and Philadelphia, upon an excursion ticket, which one conductor accepted and another refused. Spicker was pushed from the train, and left in the open country, while it was raining heavily. The fact that the ticket had been paid for was not denied, but it was shown that the company had, by advertising, tried to call in tickets of that class. The jury gave the plaintiff $5,000.

It appears from the published reports, that the company's defense in each of these cases hardly deserved consideration. The plaintiffs had both the law and the facts on their side. Yet they have been compelled to wait two or three years for justice. Many persons who are wronged by railway companies are either unwilling or unable to begin a long and costly contest in the courts. The courts, however, have almost uniformly protected and vindicated those who have chosen to appeal to them, and if every wronged and abused railway traveler could be induced to place his case before a jury, the companies would become less tyrannical, and travelers on every railway in the country would have cause for thanksgiving.—*New York Times.*

A Mile a Minute.

RAILROAD TRAINS WHICH HAVE BECOME MARVELS OF SPEED.

By far the most important element in the comfort of the traveler is the rate of continuous speed attained by a railroad train. The high rate of the accommodation train does not offset the worry and fret of the frequent stops, and a long run without getting over much ground is an annoyance almost as grievous as being side-tracked in the broiling sun on a hot summer's day to wait for a belated freight train, or an aggravating excursion which blocks the way. England, as a recent essay by Mr. A. L. Roch shows, surpasses us both in the number and speed of its fast trains, but Germany, though only a little behind, can hardly claim any superiority over this country in the matter of fast trains. The fastest train in the world for some years, and it probably is so still, though its time has been somewhat reduced, is "The Flying Dutchman," which used to cover the distance between London and Bristol, 118¼ miles, in two hours. Germany follows with a train from Berlin to Hanover, which runs 152½ miles in three hours and forty-eight minutes, which is at the rate of ~~51.7~~ miles an hour.

The palm for speed in this country is closely contested by the two companies performing the service between Philadelphia and New York. During the Centennial, two hours and a half was the shortest time known between New York and Philadelphia. Since then, two hour trains have become frequent upon the time-table, and the competition as to which road should make that time the oftener has been very sharp. According to schedule, the train leaving Jersey City by the Pennsylvania at 4.08 P. M. runs at the rate of 47.8 miles an hour, while that on the Bound Brook route runs at the rate of 47.7, but has a mile less distance to run and less populous towns to traverse. It is difficult to say which best deserves the palm for fast time. For long distance, the New York and Chicago limited is without a rival in the world, making, as it does, 913 miles in twenty-five hours. The fastest long-distance train, and the fastest train for any distance of more than fifty miles, is the express on the Orleans line between Paris and Bordeaux, which runs 359 miles in nine hours and ten minutes, or thirty-nine miles an hour.

The elements entering into the shortening of time between two distances are many, and they increase rapidly, even out of proportion to the gain in the speed. Exceptional runs have been made on nearly every railway in the country, and there are few first-class roads over which a passenger coach has not been hauled at the rate of a mile a minute. Mr. Vanderbilt has often traveled one hundred miles in one hundred minutes, and an engine has drawn a single coach between Philadelphia and New York in ninety-five minutes. The 4.08 train previously spoken of always runs some parts of the distance at a rate of more than a mile a minute, and its easiest run is from New Brunswick to Trenton—twenty-five miles in twenty-six minutes and a half. This speed is only possible, however, with a heavy engine, heavy

steel rails, a solid road-bed, a comparatively light train, slight grades, and easy curves. All of these elements have their force, and how great force will be better understood when it is known that the improvements now making on the Pennsylvania will enable the company to shorten the time between New York and Philadelphia ten to fifteen minutes, without any faster running than is done on many long stretches now. The straightening of the track and the moving of the bridge across the Passaic, and the finishing of the last cut through Bergen hill will save four minutes in the eight miles between Newark and New York, and the reducing of the grade and sinking of tracks through the northern part of Philadelphia will help almost as much more. When the work is completed, "to New York in one hundred minutes" will be a reality rather than a possibility.—*Philadelphia Press.*

Free Trade With Canada.

In the July number of *The Century Magazine*, Watson Griffin reminds his readers that Canada is now the name for the whole of British North America—a territory almost as large as the whole of Europe, rich in minerals, and possessing the finest fisheries and the largest area of land adapted to the production of first-class wheat in the world. It contains a vast territory which will yield from twenty-eight to forty bushels of wheat per acre. United States Consul Taylor says that three-fourths of the wheat-producing area of North America lies within the dominion of Canada. The Canadian Pacific Railway is being pushed through to British Columbia with an energy almost unparalleled in railway construction; and during the last three years, Manitoba has been filling up with settlers almost as rapidly as the Western States did in their most progressive days. Trade in the east of the dominion, due to this expansion of Western resources, is attaining large proportions. The time will come, Mr. Griffin thinks, when the stream of emigrants from the Eastern States will be diverted to that section of the great Northwest lying within British territory, and then, unless free trade prevails, the United States will experience what Canada did owing to the rapid development of the Western States—a loss of population without any compensating advantages in the way of trade, while eastern Canada will be built up by the trade of the Northwest. With free trade, on the contrary, the cities of St. Paul, Minneapolis and Chicago would be more convenient for the trade of western Canada than cities in the east of the dominion, and the cities of the Eastern States could compete on equal terms with those of eastern Canada. For these reasons, presented at greater length in his article, Mr. Griffin advocates free trade with Canada.

Railway Employes in Germany.

Another instance of the severity with which negligence of railroad employés is punished in Germany is given by a trial, last March, of three stationmen at Furth. One morning, last September, a live-stock train was run into a blind siding because of a misplaced switch, and many cars were thrown from the track, killing three employés and injuring ten more, and destroying property to the value of $20,000. The persons tried were a day laborer at the station, and two candidates for regular employment in the railroad service. The laborer had turned the switch to set off a car upon the siding, and, having his attention called away for a minute, forgot to close the switch, but started to carry the mail bags to the village, about ten minutes distant. It was argued for him that he was overworked. The two candidates were required, by the regulation, to inspect the switches and see that they were in order before the arrival of every train. The laborer had been in the service of the road twelve years, and was acting as post-office messenger and switchman, in addition to performing his duties as laborer, endeavoring to gain adequate support for his family of four. As laborer he received thirty-three cents a day, and in the other capacities earned $7.30 a month. There was testimony that he got but three or four hours sleep a day.

The prosecuting attorney asked that the man be sentenced to prison for a year, and the others for nine months each, and that all be disqualified from railroad service thereafter. The court sentenced the laborer and one of the candidates to six months, and the other to five months' imprisonment, and to pay one-third of the cost each.—*Ex.*

SPIKES.

A train on the New York Central and Hudson River Railroad stopped below Spuyten Duyvil a few days ago on account of a hot journal, which was blazing up and threatened to set fire to the car. The moment the train stopped the rear brakeman ran back with a red flag to stop any coming train. The conductor went to the last car to see that the brakeman was doing his duty, and then set at work to cool the journal. While he was occupied in this task a man of dignified appearance approached. "What did that man go back with that red thing for?" he asked. The conductor paid no attention to him, and he repeated the question. Finally he remarked to the unmindful conductor: "Do you know who I am?" The conductor replied that he did not, and, what was more, did not care a continental. "I am a Railroad Commissioner, sir." The conductor, nothing daunted, retorted that the Commissioner ought to know without asking what a red flag meant.

Three Chinamen, seated in a car on the Columbia avenue cable road yesterday, were bound to East Park. They waited in silence for the team to be led out. Suddenly the car started and moved away rapidly. The Mongolians sprang to their feet. "No holsee in flonts!" screamed the first, staring wildly ahead. "No holsee backe!" cried another rushing toward the rear platform. "No sabbee," said the third, seating himself. "Go like hellee, allee same."

A Young man has just written a poem on "A Fly's Back!" This is the greatest achievement of the age, because it is not more than once in six centuries that a fly is found which will keep quiet long enough to allow a poem being written on its back.—*Ex.*

Mrs. Stowe's little grandson, at the age of five, swinging on a neighbor's gate, was reproved by his mother, who told him Mr. Smith would not like it. "I don't care for Mr. Smith," said the urchin, "nor for his ox, nor his ass, nor anything that is his."

A young lover in Iowa paid $40 for a locomotive to run him thirty-five miles to see his girl, and when he got there the family bull-dog ran him two miles and didn't charge him a cent. Corporations have no souls.

"That butter is all right," said a boarding-house keeper, "it is firkin butter, and tastes a little of the wood, that's all." "If that's the case," replied a boarder who is a contractor, "I should like to get some of that wood to make railroad bridges of."

A party of young men dined sumptuously at a restaurant, and each one insisted on paying the bill. To decide the matter it was proposed to blindfold the waiter, and the first one caught should pay the bill. He hasn't caught any of them yet.

"Is this my train?" said a man at Newmarket. "I don't know, but I fancy not," said the station-master, doubtfully. "I see it's got the name of the Great Eastern Company on the side, and I expect it belongs to them. Have you lost a train anywhere?"

The longest span of wire in the world is said to be used for a telegraph in India, over the River Ristan—6,000 feet long. Sixty-six thousand of Esterbrook's Ladies' Pens, No. 1,170, joined together lengthwise, would bridge the chasm.

Comments on the Railway Exposition at Chicago.

THE EXPOSITION.

THE National Exposition of Railway Appliances closed according to announcement Saturday night, June 23. As an exhibition it was a great and undoubted success. Our readers have been fully informed as to its salient points and much of the detail. Owing to the vastness of the affair and the limited time, it was utterly impossible to compass all its features of interest and importance during its continuance. Our columns will therefore contain extended references to it for some time to come.

It is greatly to be regretted that anything was attempted beyond an exhibit pure and simple. The competitive system has been a prolific cause of trouble and complaint, and has rendered it unsatisfactory to a large proportion of the exhibitors as well as to the management. Most of the complaint has been of a petty character, and while annoying, is entirely unworthy of attention. The awards of medals were not made until during the current week, while it was expected that they would be made before the close of the exhibition. The cause of this was the unwise plan of appointing juries. The appointments were, as is well known, made from nomination made by the exhibitors. Exhibitors were then allowed to protest against individual jurors, the idea of the commissioners being to exercise the utmost fairness. Theoretically this was very fine, but practically it worked infinite trouble. The jury list as published was, on the whole, very good. But it at once appeared that there was a great repugnance among many of the most capable men to serving in such capacity. Some of them absolutely refused, and their places had to be filled by others. Then the protests began to come in—some of them with a show of reason, but many with none whatever. Many of the juries had to be re-formed four or five times, until it became necessary in some cases for the commissioners to take what they could get. While this tedious and annoying work was occupying the commission, time slipped rapidly away, and with it went some of the selected jurors. The hours of the Exposition were numbered, and extension was impossible. The necessary result of this was some hasty work on the part of juries, and unavoidable delay in announcing their verdicts. A large amount of disappointment is inevitable in connection with any system of making awards. Unfortunately it was greatly aggravated in this case by a plan of operations which was really designed to obviate all just cause of complaint.

One prolific source of complaint was the failure to make any practical or scientific tests. Considerable prominence was given to the subject of tests in both the printed matter and the letters sent to parties desiring space. It was announced that adequate plans and preparations had been made for such tests, and that all could have tests who desired them. All applicants were, however, supplied with copies of the rules and regulations. These specified (Rule VI, Section 1) that "awards will be based upon examinations and tests made in the most thorough possible manner." But they also specified (Rule VI, Section 7) that "expert tests will be made where a majority of the exhibitors in a class, exhibiting articles intended for a like purpose, make the request, such request to be filed with the secretary on or before April 1. The expense of expert tests to be borne by the competitors requesting them." We cannot learn that any exhibitor protested against this rule, or that any class of exhibitors made request under it for tests. Many came fully expecting such tests, they say, and were disappointed in not having them; but it does not appear that they took the means pointed out in the rules.

That the juries did not make "examinations and tests in the most thorough manner possible" is beyond dispute. This was, as we have seen, largely due to obstacles met by the commissioners in securing juries and the extremely limited time left for the juries to act.

Looking back over the affair from its first conception to its close, several things suggest themselves to honest criticism—(carping critics can always find abundant material in the best managed affairs). The points we allude to (besides the unfortunate award system) are these: Business prudence dictated that the organization should be incorporated, and the stock scattered as widely as possible among exhibitors. This would have given a widely distributed financial responsibility and a corresponding interest in aiding and upholding the management. It would also have been a relief to the commissioners, who, as it is, are obliged to shoulder a load which does not properly belong to them. Another point which is justly made is, that there has been an abundant lack of system and not sufficient division of responsibility. A man may be very able in his specialty and yet not able in everything else, and no matter what his ability, there are fixed limits to capacity and endurance. It was possible at an early day to have called in sufficient ability and experience, and to have effected an efficient division of labor. As it was not done, the results became apparent as soon as the Exposition opened. Then several of the commissioners threw themselves nobly into the breach, and have esteemed no sacrifice of time, money and health too great. How well they have worked, and how much credit they are entitled to for it, no one can properly estimate who has not seen them day by day at their tasks. They have no recompense except such credit and reputation as the public sees fit to award them; and to meanly attempt to detract from this is simply contemptible.

The Exposition goes into history as a most important industrial event. Time will clear up the clouds cast about it by petty malignity, and its true worth will be appreciated by all, as it now is by those far-seeing ones whose sight is not easily dimmed by inevitable smoke of even industrial battles.—*Railway Review.*

THE RAILWAY EXPOSITION.

The Railway Exposition is ended and the vast building and the adjacent grounds, which for a month have been filled with the greatest display of machinery and appliances ever before brought together, are already nearly empty and forsaken. The work of assembling this great collection, much of it consisting of heavy and complicated machinery, required so much time as to considerably delay the complete opening of the exhibition, and the work of removal was so great that a full week or more will be required to accomplish it. General regret was expressed among exhibitors and visitors that this magnificent display, gathered and put in position by the expenditure of so much money, labor and ingenuity, had to be torn up so soon after it had got into smooth working order, but other engagements for the building made it impossible to secure an extension of time.

It is too soon for the public to realize the vast benefits which will accrue from this great exhibition. One thing is admitted, even by the always fault-finding and censorious—that the exposition was an unparalleled success in respect to the character and number of exhibits. That it was conducted with scrupulous integrity and a desire to do justice to all interests concerned, and that the commissioners were animated by a high degree of public spirit, sacrificing thereto their own business and comfort, assuming without any recompense great pecuniary responsibilities and unremitting and harassing labors by night and day, a glance at their names and at the record of the exposition itself plainly testifies. When it is remembered that there was no permanent organization back of this enterprise, and that the handful of gentlemen who took the active management, abandoning their own business meantime, found themselves involved in a work of enormous magnitude and complication which they knew would receive little appreciation, it seems surprising that the exposition was so well managed and that so little cause for com-

plaint was given. Of course, where a great number of men are eargerly competing for prizes it is impossible that all should be satisfied with the result, but while there was, as is the case with all public undertakings, some fault-finding and ill-natured criticism, the general verdict of the public press and of the exhibitors and visitors has been that of extreme satisfaction. This feeling has been expressed in a letter prepared and signed by a very large number of the most prominent exhibitors without the knowledge of any gentlemen connected with the management of the exposition, expressing high appreciation of "the uniform courtesy and fairness which has attended the management of the National Exposition of Railway Appliances," and of the benefit which it has been to "scientific men and skilled artisans everywhere."

It is too early yet to announce the exact pecuniary results of the exposition, but it is probable that the receipts from exhibitors and visitors have not been sufficient to meet the heavy expenses, and that the managers will have to make good a considerable deficit.

We have obtained from the treasurer, J. McGregor Adams, Esq., the following statement which, it is believed, will not be materially changed by the final figures :—

RECEIPTS.

Space fees	$25,560 02
Entrance fees	5,115 00
Premium fees	6,405 00
Exhibitors' tickets	6,779 00
Admissions	61,534 45
Miscellaneous	1,792 43
Elevator	613 20
Electric railway	2,649 60
Railroad coupons received	3,180 00
Estimated value of material on hand	10,000 00
Total	$123,628 70

DISBURSEMENTS.

Expense account	$10,954 38
Pay rolls	13,824 94
Printing, stationery and advertising	9,350 91
Annex buildings	28,810 17
Annex tracks	5,171 85
Alterations and improvements in main building	17,121 10
Electric railway	12,187 55
Machinery and steam account	7,306 40
Furniture and fixtures	622 57
Foreign exhibits	2,283 30
Estimated cost of medals	10,000 00
Oustanding liabilities	16,000 00
Total	$133,633 17
Possible deficit	$10,000 00

Although a considerable portion of the cost of the Exposition fell upon the exhibitors in the form of space fees, etc., as was proper, seeing that they were the parties to be directly benefited, the general testimony of these exhibitors is that their outlays have been reimbursed many fold by the sales made and by the publicity which has been given their manufactures and devices.

Perhaps the most difficult feature of the exhibition plan was the award of prizes. The services of the juries were voluntary, and as they involved no little labor and much unpleasant criticism, it was with considerable difficulty that competent persons were found to serve. The jurors, however, worked faithfully and impartially and have only just completed their verdict, which is shown in the list of awards published in this issue. While it cannot be expected that the decisions will be satisfactory to all, the fairness and good intentions of those making them cannot be questioned.

It seems proper to add that no article which has appeared in *The Railway Age* since the commencement of the Exposition has been written, suggested or even seen before publication by any one connected with the exposition management.—*The Railway Age, June* 28.

PORTLAND, Oregon, is to have this year a million dollar bridge and railroad workshops costing five millions.

[Advertisement.]

CHICAGO PAPERS ON

Valentine & Company's EXHIBIT OF VARNISHES

AT THE

RAILWAY EXPOSITION.

Paint, Oil and Drug Review, June, 1883.

Valentine & Co., manufacturers of railway and carriages varnishes, have a handsome booth occupying quite a space, which is made of solid cherry and highly polished. It is modeled with most excellent taste and arranged with entire harmony as to colors, and is a feature of large attraction to visitors. It is situated near the main entrance to the Exposition Building, facing on three avenues. The well-known brand of varnishes made by this company are distributed about the booth in a modest manner, in the regular packages which have been nickel-plated before being filled. They have also a number of fine cut-glass vessels, which clearly show the body and color of the various varnishes. The booth is open on the sides fronting on the three avenues. It is surmounted with painted banners, with the names, "New York, Chicago, Boston, Paris," which our readers will recognize as the houses of this company. Along the top of the four sides are very handsome shields which are polished and varnished with their goods, upon which is painted their familiar trade-mark. The merit of their work is seen on a large number of panels which have been painted with railway colors before being varnished. A most tasty and finely fitted office, which can be closed as occasion warrants, occupies part of the booth. The lights are made of colored glass artistically arranged, while the carpetings and upholsterings are in perfect accordance with the surroundings. The private office is furnished with desk and writing materials which many of the visitors find very convenient. There is also placed within the booth, after the model of one of their varnish cans, an ice-water cooler. The exhibit certainly stands eminently out as one of the best, if not the most tasteful display to be seen in the Exposition Building. It is illuminated by the Brush Electric Light, and presents a very fine appearance in the evening.

Chicago Times, June 21, 1883.

An unusually attractive exhibit is that of Valentine & Co., manufacturers of railway and carriage varnishes. The framework of the booth itself, which is located near the main entrance, is of solid cherry, highly finished. The electric light combined with the brilliant varnish and handsome fittings, make a most beautiful and striking display. In the cities of New York, Chicago, Boston and Paris this company have branch houses, and an extensive business with foreign representatives at London, Vienna, Barcelona, Amsterdam, Moscow, Melbourne, Sidney, Adelaide, and Wellington, New Zealand.

A practical illustration of the superiority of the varnishes manufactured by Valentine & Company, is presented in a large variety of finished panels in the standard colors of the Pullman, Pennsylvania, and Chicago and Northwestern railway companies. The magnificent car built by John Stephenson, of New York, for the North Chicago Railway Company, and on exhibition in the west annex, affords another practical illustration of the beauty of these varnishes. This car, which is greatly admired, has been on exhibition through all the rain and dampness attending the Exposition, and is yet as bright as a new dollar. Valentine & Company have received medals wherever their varnishes have been exhibited. If the award is made for superiority in quality of goods, this company will, it appears, have a clear field from the outset, as they admit of no rivals in the make of railway varnishes.

Daily Telegram, June 16, 1883.

FINE POLISH AND DURABILITY.

Valentine's railway varnishes now stand preëminent in all countries where civilization has created a demand for first-class transparent polish. New York, Chicago, Boston and Paris are the centers where the company have warehouses and offices from which the world can be supplied with the productions which this justly celebrated firm manufacture. One of the leading specialties, and for which we understand this company admits no rivalry, is the tone of railway coach finishing varnishes. The rewards of merit held by the Valentine Company for goods in their line include the following, to wit: International Exhibition, Philadelphia, bronze medal and diploma, 1876; Exposition Universelle, Paris, France, silver medal and first degree of merit, 1881-1882; American Institute, New York, silver medal and diploma, 1859; Melbourne International Exposition, Melbourne, Australia, silver medal and first degree of merit, 1880-1881; Mechanics' and Agricultural Fair Association, Louisiana, diploma, 1873; Mass. Char. Mechanics Association, Boston, silver medal and diploma, 1860; Maryland Institute for the Protection of the Mechanic Arts, silver medal, 1877; Mechanics' Institute, silver medal, 1877; Exposition Peru, medal, 1870. The peculiar merit awarded by all to Valentine's varnishes consists in the high degree of polish attainable, and their great durability.

Railway Age, June 7, 1883.

The exhibit of Valentine & Co., avenues A and B, is displayed very tastefully in a splendid structure of stained cherry and brass surmounted by banners, on which are inscribed the names New York, Boston, Chicago and Paris, cities in which they have establishments.

June 21, 1883.

Messrs. Valentine & Co., manufacturers of fine coach and car varnishes, occupy a pavilion south of the main entrance. The display of varnishes in tubes and cans is worthy of more than a passing notice. The railway coach finishing is very pale, dries in about eight hours and hardens ready for use in three to five days. Inside coach finishing varnish, though not so durable as the above, is similar in color, luster and working. The railway coach rubbing varnish dries in six to eight hours and hardens in four days. Inside coach rubbing dries quicker and harder than the above. Valentine's locomotive finishing is well adapted to its purpose. The smoke-stack varnish is an elastic black that dries quickly. Railway Japan gold size is a superior oil-drier of light color, nearly double the strength of ordinary Japan. In 1876, Valentine & Co. were awarded bronze medal and diploma at Centennial International Exhibition, Philadelphia; 1877, silver medal, Mechanics' Institution, San Francisco; 1878, silver medal, Exposition Universelle, Paris, France.

Railway Purchasing Agent, June, 1883.

Valentine & Co., of New York, Chicago, Boston and Paris, occupy at the Exposition a pavilion of great beauty and tasty design, erected on the east side of the building, a short distance from the main entrance. In this is a private office and some comfortable seats, while the walls are adorned with many beautifully varnished designs, giving practical illustration of the qualities of their varnishes. Transparencies and handsome fittings make this one of the most attractive of resorts, which will, no doubt, be appreciated by railroad men who are looking for first-class goods in this line."

Chicago Journal of Commerce, June 20, 1883.

Valentine & Co., manufacturers of fine coach and car varnishes, occupy a pavilion south of the main entrance which is conspicuous from the extreme good taste displayed in its construction and appliances. The wood work is of stained cherry, the panels in ground glass, with richly stained glass at intervals, giving a pleasing effect to the whole. On each of the corners surmounting the enclosure are four pennons in light blue and gold, bearing the names of the parent house and branches, New York, Chicago, Boston and Paris. The display of varnish in tubes and cans is worthy of more than a passing notice. The railway coach finishing varnish is very pale, dries out of the way of dust in about eight hours, and hardens sufficiently free from touch to be ready for use in three to five days. In working, fullness, luster and durability, it is unsurpassed. Inside coach finishing, though not so durable as the above, is similar in luster, color and working. The railway coach rubbing varnish dries in six to eight hours and hardens in four days so as to rub without sweating. Inside coach rubbing varnish dries quicker and harder than the above, and in good weather will harden in two days; it is sufficiently pale for any light work. Valentine locomotive finishing varnish is well adapted for its purpose; it dries over night out of the way of dust, and hardens ready for use in two or three days. The smoke-stack varnish is an elastic black that dries quickly and has a fine luster and durability. Railway Japan Gold Size is a superior oil-drier of light color, nearly double the strength of the ordinary Japan, and once known is indispensable to coach and car painters for binding and hardening through. It will be interesting to name say three of the exhibitions out of a dozen or so where Valentine & Co. secured medals and diplomas. In 1876 they were awarded the bronze medal and diploma at the Centennial International Exhibition, Philadelphia; 1877, silver medal, Mechanics' Institute, San Francisco; 1878, silver medal, Exposition Universelle, Paris, France.

Evening Telegram, June 14, 1883.

One of the neatest and most unique booths in the Exposition is that of Valentine & Co., varnishes, located south of the main entrance, avenues A and B. The architectural beauty of the design, the material of which it is built, and the elegant finish upon the natural cherry wood, strikes the visitor forcibly, thus attracting the attention to the samples of varnish upon exhibition. Valentine's Railway and Coach Varnishes deservedly stand in the front rank where their merits are known. It is with the view of calling attention of visitors to the reputation of this firm as manufacturers of the higher qualities of varnishes that the writer was induced to stop here and study the subject of varnish. He is convinced that the samples of varnish exhibited cannot be surpassed by any manufacturer in the land. It is this very superior quality that imparts the transparent polish to the railway car, interior and exterior, placing the name of Valentine far above the average manufacturer.

The Lake Shore and Michigan Southern Railway Co.

Treasurer's Office, Grand Central Depot,
NEW-YORK, June 22, 1883.

The Board of Directors of this Company have this day declared a quarterly dividend of TWO PER CENT. upon its capital stock, payable on WEDNESDAY, the FIRST day of AUGUST next, at this office.

The transfer books will be closed at 3 o'clock P. M. on FRIDAY, THE 29TH INSTANT, and will be reopened on the morning of Monday, the 6th day of August next.

F. W. VANDERBILT, Acting Treasurer.

Office of the Central Pacific Railroad Company,

No. 23 BROAD ST., NEW-YORK, June 25, 1883.

The coupons of the first mortgage bonds of the Central Pacific Railroad Company, the Western Pacific Railroad Company and the California and Oregon Railroad Company, due July 1, 1883, will be paid at the office of Fisk & Hatch, No. 5 Nassau St.

Holders presenting ten or more coupons will leave them for examination, in which case a receipt will be given and payment made on the following day.

E. H. MILLER, JR., Secretary.

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Atlanta Machine Works, Atlanta, Ga.
Baldwin Locomotive Works: Burnham, Perry, Williams & Co., Phila., Pa.
Barney & Smith Manufacturing Co., Dayton, Ohio.
Beaver Falls Car Co., Beaver Falls, Pa
Osgood Bradley, Worcester, Mass.
J. G. Brill & Co., Philadelphia, Pa.
Brooks Locomotive Works, Dunkirk, N. Y.
Brownell & Wight Car Co., St. Louis, Mo.
M. M. Buck & Co., St. Louis, Mo.
Erie Car Works, Erie, Pa.
Gilbert & Bush Co., Troy, N. Y.
Harlan & Hollingsworth Co., Wilmington, Del.
Haskell & Barker Car Co., Michigan City, Mich.
Hazelton Car Works, Hazelton, Pa.
Indianapolis Car and Manufacturing Co., Indianapolis, Ind.
Jackson & Sharp Company, Wilmington, Del.
Jones Car Manufacturing Co., Schenectady, N. Y.
Keith Manufacturing Co., West Sandwich, Mass.
Kingston Car Works Co., Kingston, Canada.
Laconia Car Co., Laconia, N. H.
Lima Car Co., Lima, Ohio.
Wm. Mason & Co., Taunton, Mass.
Mansfield Machine Works, Mansfield, Ohio.
Muskegon Car and Engine Works, Muskegon, Mich.
Ohio Falls Car Co., Jeffersonville, Ind.
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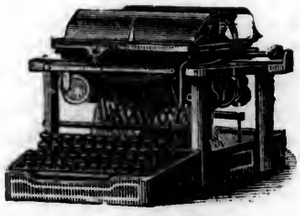
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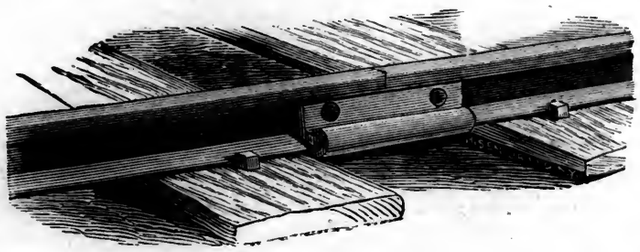
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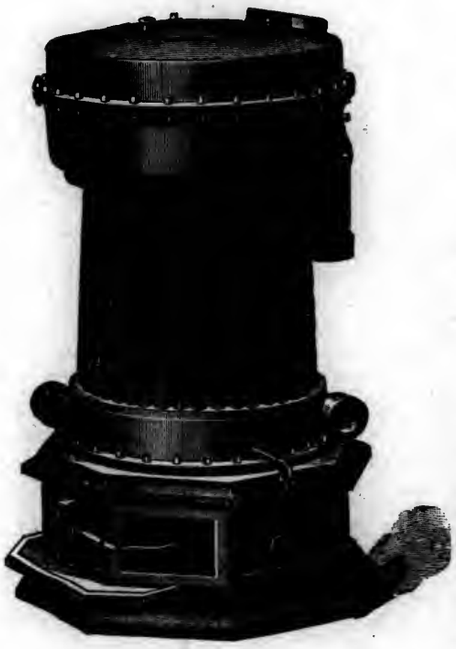
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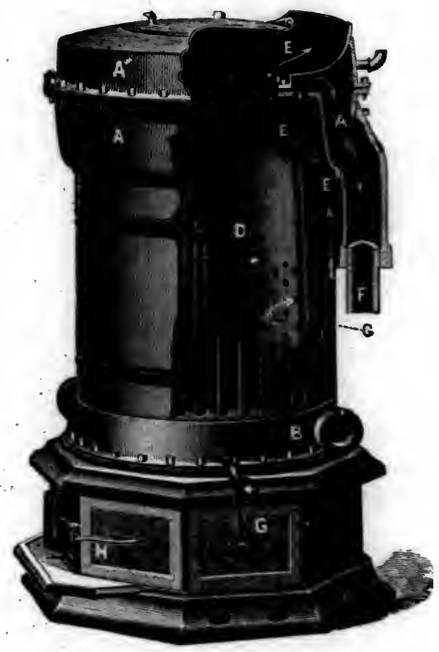
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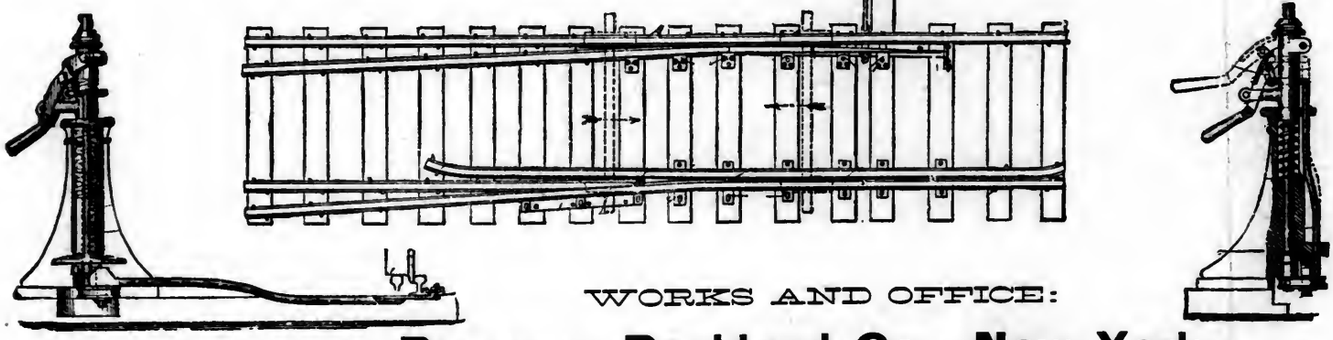
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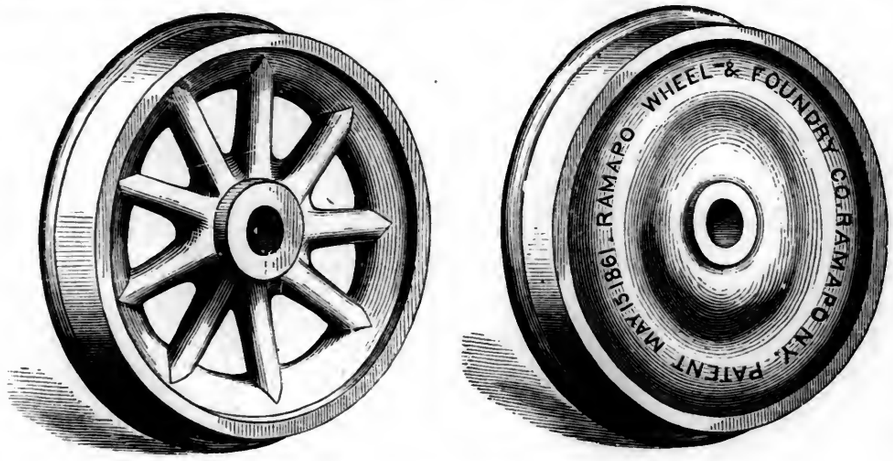
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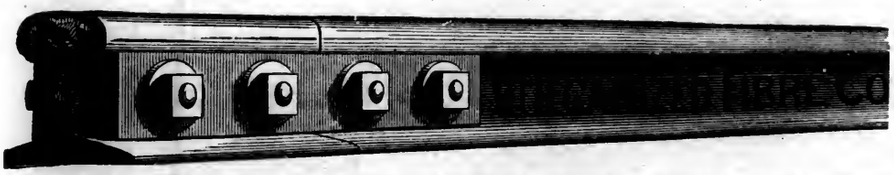
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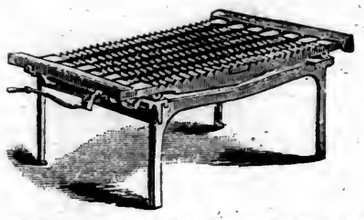
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AMERICAN Railroad Journal

·ESTABLISHED·1831·

Railroads, Tramways, Finance, New Inventions, Machinery.

WHOLE NO. 2,543.] NEW YORK, AUGUST, 1883. [VOLUME LVII.—NO. 5.

Railroad Notes.

WE invite railroad officers to send us notice of elections, transfers, appointments, resignations, etc.; and all our readers would oblige us by furnishing us with any items of news which may come to their knowledge and are of a suitable nature for our columns. It is our intention to publish monthly full and accurate information regarding those enterprises and industries to which the AMERICAN RAILROAD JOURNAL is devoted, and to effect this end we solicit the coöperation of readers interested therein. We aim specially to record all new railway enterprises in the United States and Canada, and to note the progress of construction on all new roads and extensions; and we request those concerned in railway building to give us early information concerning the above, that our reports may be as complete as possible.

CONSTRUCTION.

THE Texas and St. Louis Narrow Gauge Railway, of which Col. J. W. Paramore is president, has been completed.

THE last spike on the main line of the Northern Pacific railroad will be driven Sept. 8th. The two divisions will meet about fifty miles west of Helena, Montana.

OVER four miles of the Springfield and Southern Railroad have been graded, and it is expected that a large force will be put on in a short time, and the work rapidly pushed.

THE preliminary survey of the new branch of the Baltimore and Ohio Railroad, extending from Mt. Pleasant to Punxsutawney is nearly finished.

THE first train of the Atlantic and Pacific Railroad was run on the 8th inst. to a junction with the Southern Pacific Railroad—the bridge over the Great Colorado River having been completed on that day and the last rail laid. Connection is also made with the Atchison, Topeka and Santa Fe, and the St. Louis and San Francisco roads. The route being on the 35th parallel is consequently free from snow in the winter.

THE contract for building the extension of the Jacksonville and Southeastern Railroad to Centralia, Ill., has been awarded to Messrs. Larkworthy, Collins & Co., of Quincy, Ill., who will push the work of construction to an early completion.

THE grading of the Jacksonville, Tampa and Key West Railroad, between Jacksonville and Palatka, Florida, is nearly completed, and track-laying will soon be commenced. Enough iron is now on hand to lay ten miles o track.

SURVEYS are now in progress for the extension of the Burlington, Cedar Rapids and Northern Railroad north from Worthington, with Bismarck as an objective point.

THE main line of the Chesapeake and Ohio Railroad now extends from Old Point Comfort, Va., to Lexington, Ky., a distance of 644 miles. This is the only route through the celebrated spring region of Virginia. Eight mahogany-finished Pullman coaches have just been added to the equipment of this road.

THE track of the New Orleans and Mississippi Valley Railroad was laid to within fifteen miles of Baton Rouge on the 10th inst., and will be completed to that point by the 1st of September.

THE line of the Bluffton and Union (Indiana) Railroad has been located from Winton to near New Pittsburgh, about six miles east of Ridgeville, and from Bluffton to Camden in Jay county.

THE track is now being laid on the Columbus, Hope and Greensburg Railroad, and it is expected that trains will be running between Hope and Greensburg by the 1st of September.

TWENTY-THREE miles of the Duluth and Iron Range Railroad, north of Agate Bay, have been graded, and track-laying will commence at an early day.

AMONG the several railroad schemes now on foot in St. Joseph, Mo., is a line known as the Des Moines, Osceola and St. Joseph, which is now in operation between Des Moines and Osceola, and will be extended from the latter point to St. Joseph. The St. Joseph and Rio Grande Railroad is also being surveyed. It is thought both the above roads will be built.

THE Pacific Coast Railroad company have in contemplation the extension of their road from Los Alamos to Santa Barbara, about eighty miles. The road is now in operation from Port Hartford, Col., to Los Alamos, sixty-four miles, having been extended from Santa Maria to that point, twenty-one and a half miles near the close of last year.

SURVEYS are now in progress for a new branch which, it is said, is to be built at once by the New York, Lake Erie and Western Railroad company, from Montclair N. J., to Morristown, a distance of twelve miles.

THE gross earnings of the Buffalo, New York and Philadelphia Railroad company are said to be at the rate of $3,000,000 per annum.

THE new station, building by the Lehigh Valley Railroad company at Wilkesbarre, is rapidly approaching completion, and will be the finest along the line of that road.

THE tunnel of the Delaware, Lackawanna and Western Railroad company at Nicholson, has been completed, and trains are running through it. The tunnel is 2,177 feet long by 21 feet high, and was commenced about one year ago.

THE freight traffic over the Philadelphia and Reading Railroad is rapidly increasing. From twenty-eight to thirty-five coal trains pass down the main line every twenty-four hours. The business on the Lebanon Valley branch is said to be heavier than it has been for many years.

At Altoona, in all the railroad shops, working time is nine hours. The nine-hour system will continue probably through the first part of the winter months, owing to the orders for new work being about completed.

PERSONAL.

CAMPBELL WALLACE has been re-appointed railroad commissioner by the Governor of Georgia.

GEORGE R. BOTTOM, cashier of the Baxter National Bank, Rutland, Vt., has been elected by the Rutland Railroad Company as register of the common and preferred stock of the company.

CHARLES CLEMENT has been elected president, J. A. Mead, treasurer, and James C. Barrett, clerk of the Rutland Railroad Company.

FRANK C. HOLLINS has been elected a director of the St. Louis, Alton and Terre Haute Railroad Company, vice Charles G. Landon.

S. B. WHITNEY has been appointed general superintendent of the Lehigh and Wilkesbarre Coal Company. Mr. Whitney is the successor of Charles Parrish, of the Wyoming and Audenreid Division.

BARNARD BROWN has been appointed assistant freight and passenger agent of the Cincinnati, New Orleans and Texas Pacific Railroad, with headquarters at Cincinnati, Ohio.

B. F. MITCHELL has been appointed freight and passenger agent of the Chesapeake, Ohio and Southwestern Railway Company, with headquarters at Louisville, Ky.

J. H. PALMER, late general freight and passenger agent of the Massachusetts Central Railroad Company, has been appointed to an important position upon the Chicago and West Michigan Railroad, and will be located at Grand Rapids, Mich.

GENERAL W. J. PALMER has resigned the presidency of the Denver and Rio Grande Railway Company.

AN inventory of the estate of the late Chester W. Chapin, filed in Springfield, Massachusetts, gives the valuation of the personal property at $1,986,000 and of the real estate at $171,800.

JAMES COOKE,. president of the Cooke Locomotive Works, of Paterson, N. J., died at Bloomingdale in the Adirondacks, where he has resided for several years on account of his health. He caught a severe cold at the fire in the works in 1880, and has been consumptive ever since. He was forty-five years of age, one of the leading citizens of Paterson, and leaves a large estate.

THE physicians in attendance on Col. E. D. Frost, general manager of the Natchez, Jackson and Columbus Railroad, say that although his condition is serious, he will probably recover.

PRESIDENT ROBERTS, of the Pennsylvania Railroad Company, has left for a ten days' vacation, during which time he will visit the Catskill Mountains and Saratoga.

SAMUEL G. BLAKE, for many years a messenger in the Pennsylvania Railroad Company's main building, principally in the office of A. J. Cassatt, died at Norristown on the 8th inst., of paralysis.

INCORPORATION.

A CHARTER has been granted to the Topeka and Ottawa Railroad company with a capital of $1,000,000. The directors are: G. W. Neale, A. I. Bonebrake, John Guthrie, P. Shiras, Robert Alkenson and Joel Huntoon, of Topeka, and L. L. Sharpe, of Ottawa, Kansas.

THE Pine Creek and Susquehanna Railway company, a narrow-gauge road, was chartered at the State Department, Harrisburg, Pa., on the 10th inst. The capital is $400,000. The line extends from Pike Mills, Potter county, to Westport, Clinton county—a distance of forty miles. Among the directors are Thomas C. Platt, William C. Sheldon and George R. Blanchard.

THE Harrisburg and Southwestern Railroad company was chartered at Harrisburg, Pa., on the 10th inst., with a capital of $5,000,000. The road will be ninety miles in length, through Dauphin, Cumberland, and Franklin counties. Robert H. Sayre, of Bethlehem, Pa., is president of the company.

ARTICLES of incorporation were filed on the 8th inst. with the Secretary of State of Wisconsin, of the Princeton and Western Railway company, having $50,000 capital. The proposed road is to run from Princeton, Green Lake county, on the Chicago and Northwestern Railway, through Marquette, Adams and Juneau counties to Valley Junction, Monroe county, on the St. Paul and Omaha Railway. It is to be 75 miles in length, 25 miles to be completed this season.

ARTICLES of incorporation were filed with the State Auditor at Des Moines, Iowa, on the 6th inst. of the Chicago, Lyons and Pacific Railroad company, with a capital of $10,000,000. The object of this company is the construction of a railroad from the Mississippi River at or near Lyons, thence to the Missouri River, with branches to the northwestern and southwestern boundaries of the State. The principal place of business is to be at Lyons for the first two years, and thereafter at such place as the directors may designate. The incorporators are J. C. Root, J. W. Esery, W. P. Scott, H. B. La Rae and J. L. Brown.

THE St. Joseph, Joplin and Gulf Railroad company was recently organized at Troy, Kansas, with a capital of $2,500,000. The road will extend from Elwood, opposite St. Joseph, to Troy, thence to Joplin, and thence through Arkansas to the Gulf.

ORGANIZATION.

AT a meeting of the directors of the Richmond and Danville Railroad company, held on the 10th inst., Robert Harris, John T. Branch, A. D. Shepard and T. M. Logan resigned, and the following gentlemen were elected to fill the vacancies: George S. Scott, George F. Baker, George I. Seney and Cabron S. Brice. This, it is said, secures to the Scott-Seney syndicate complete control of the property.

AT the annual meeting of the New Brunswick Railroad company, held at St. Johns, New Brunswick, on the 3d inst., the following officers were elected: Samuel Thorne, president; the Hon. Isaac Burpee, vice-president; E. B. Burpee, general manager. J. S. Kennedy, New York, and J. Kennedy Todd, New York, with the officers above named, form the executive committee. The other directors are the Hon. Lord Elphinston, of Scotland; George Stephen, Montreal; H. Northcolt and D. Willis James, New York. The company is now operating 420 miles of road.

AT the recent annual election for directors of the Cleveland and Mahoning Railroad company, Stevenson Burke, J. H. Devereux and Charles Hickox were chosen directors for three years. The board consists of these gentlemen and E. B. Perkins, E. B. Hale, Charles Pense, Joseph Perkins, R. Hitchcock and John Tod. The directors organized by electing Stevenson Burke, president, J. H. Devereux, vice-president, E. B. Perkins, treasurer, and E. E. Poppleton, secretary.

THE directors of the Southeastern Railway company, recently elected, are: Bradley Barlow, Emmons Raymond, J. Thos. Vose, Duncan McIntyre, A. B. Chaffee, B. B. Smalley, F. A. Metcalf, C. N. Bishop, J. O'Halloran and T. A. Mackinnon.

THE Chicago, Iowa and Kansas Railroad company was organized at Topeka, Kansas, on the 5th inst., with a capital of $5,000,000. The directors are: W. W. Guthrie, Thomas J. White and George T. Bowers, of Atchison, and W. J. Ladd, E. E. Pratt, A. G. Stanwood, Henry Parkham and N. H. Stone, of Boston, Mass. The proposed route is through the counties of Marshall, Washington, Republic, Cloud, Ottawa and Saline to Salina and from thence to Belleville.

A CHARTER was filed with the Secretary of State of Kansas, on the 3d inst., of the St. Louis, Emporia and Denver Railway company. The road is to run from St. Louis to Denver, and the estimated length is 1,000 miles. The capital stock is $20,000,000. The board of directors for the first year comprises Gov. Charles Foster, of Ohio; Congressman Amos Townsend, of Ohio; Senator Warner Miller, of Herkimer, N. Y.; John D. Perry and John Scollin, of St. Louis; J. L. Pace, of Butler, Mo.; R. W. Blue, William Martindale, H. C. Cross, and C. Hood, of Kansas, and Thomas M. Nichol, of New York City.

MISCELLANEOUS.

THE Lehigh Valley road has secured entrance to Buffalo over its own tracks.

THE Chicago, St. Louis and Pittsburgh Railroad company has purchased the right of way and other franchises of the Miami Valley Railroad company, and will build the road from Piqua to Troy, in Miami county. Surveys were made, the line located, and considerable right of way secured and contracted for last year, but the company has been unable to go any further with the work up to this time. The alleged purchase by the Pan Handle is claimed to be the beginning of a new line of road from Xenia, through Troy, Piqua, and Minster to Fort Wayne.

THE National Railroad Company of Japan, incorporated with a capital of $20,000,000, under the auspices of the Japanese government, two years ago, has adopted the American system of building railroads, and is now constructing the main line which extends from Tokio to Anderson, the northern seaport of Japan, a distance of 450 miles. A part of the main line, about fifty miles in length, has already been finished, and will be open to the public this month or next. The terminus of the line is the commercial center of a province where silk culture is the principal occupation of the people. The silk raised in this province is highly esteemed in foreign markets, and is exported to America as well as Europe in large quantities every year. It is expected that the whole line will be finished within three years.

THE Lackawanna fast freight line bids fair to become one of the leading lines in the country. It has had a remarkable growth for a new organization.

DULLNESS of freight traffic has caused a suspension of 150 men in the Fort Wayne shops for an indefinite period, though it is thought that they will be needed again in six or eight weeks.

EIGHTEEN hundred men are said to be at work on the West Shore road between Kingston and Catskill village. Much trouble has been found to construct a solid and permanent road-bed just below and also above Catskill. The track is now unbroken between New York and Syracuse, and it is thought the line will be opened to the latter city early in September.

THE rapidity of construction on the main line of the Canadian Pacific Railroad in the first week of July, is without parallel in this or any other country. On Saturday, July 7th, rails were laid upon six miles of road, and in the week not less than 25 86-100 miles, exclusive of sidings, were completed—an average of about four and one-third miles per day. This is the highest rate ever attained.

BRADLEY BARLOW denies that the Southeastern Railroad has been sold to the National Construction Company of New Jersey, though he "hopes to sell the road to these parties."

THE Lehigh Valley Railroad Company have a corps of engineers at work at present, surveying and locating a line of railroad from Slatington to Port Clinton. The route lies about midway between the Schuylkill and Lehigh Railroad and the Blue Mountain.

ABOUT thirty miles of the track of the N. O. and M. V. road has been thoroughly ballasted with sand, which is obtained at the old Bonnet Carre crevasse, and which is being hauled by dirt trains to the upper and lower portions of the road. The ballasting work is going ahead rapidly, and it will catch up with the track-laying gang by the time the rails reach Baton Rouge. Section houses are now being built along the road, and every effort is being made to have the road ready for business as soon as possible after the track reaches Baton Rouge.

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GEO. F. SWAIN, PRESIDENT. L. FAIRBANKS, JR., VICE-PRESIDENT.
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ADVERTISERS and subscribers are respectfully cautioned against making payments to any person professing to represent this JOURNAL, *excepting he is able to show a written order from this office, duly signed by the president or secretary.*

ALL copy for publication in the AMERICAN RAILROAD JOURNAL, both advertisements and articles, should be mailed to reach the publishers not later than the end of the month previous to that in which it is expected to appear. There is no fear of being too early in sending, and our correspondents would oblige us by anticipating, as far as possible, the last day on which we can receive copy.

☞ No railroad passes should be given to any one representing this Journal, unless he shows written authority to ask for same, signed by the President or Treasurer.

NEW YORK, AUGUST, 1883.

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OUT OF THE FIRE.

SINCE the date of our last issue, this publication of the Phenix Company, has arisen, like the fabled bird of antiquity, from the ashes of a mighty conflagration. On the twenty-second ult. our printer's office, occupying a portion of the old Munro Building, was completely gutted by fire. Copy prepared for the compositor passed away in smoke, type was melted, and in short, the total "plant" destroyed. Fortunately the July impression had been perfected and nearly all distributed, so that, as in the case of the good man who broke his leg and thanked God 'twas not his neck, we have reason to be glad that our misfortune was not nearly so great as it would have been had it occurred a week sooner. Moreover, the lives of the sixteen noble firemen, at one time during the fire imminently endangered, were saved; and, on the whole, we can record the accident, not only without depression of mind but with cheerfulness.

Once more the AMERICAN RAILROAD JOURNAL appears in a brand-new dress, the old one being entirely gone. It provides greater comfort to the reader, and is equal in every other respect to the old. With the exception of the improvement indicated, we make no change in the appearance of the JOURNAL, which, we are proud to say, is one of the handsomest published on this side of the Atlantic. The expression of our regret is due to those who will be disappointed because of the non-appearance of matter which they expected to see in the present number. Our readers will excuse the delay of a few days, necessitated by the fire, and which the utmost diligence on the part of publishers, editors and printers could not prevent. In the course of a short time, all articles intended for publication which were destroyed in the blaze will be reproduced, as several have been preparatory to the present issue.

CIVIL SERVICE REFORM.

THE National Civil-Service Reform League has issued a pamphlet entitled "The Four Years' Term, or Rotation in Office," by FREDERICK W. WHITRIDGE, which we judge is distributed gratuitously to the different journals, one having been received at this office.

In the course of a year many pamphlets on as many different subjects find their way to our editorial desk, the majority of which find a rapid transit to the editorial waste basket. We have, however, deemed this subject of so much importance, and the modification of the present law so great a necessity, that we have carefully read the pamphlet in question, and freely and fully subscribe to the statements there made. The document is certainly a timely one, for we judge that many like ourselves had forgotten or were ignorant of the existence of such a law, as the law of May 15, 1820, limiting the terms of certain officers to four years.

In regard to the movement being timely, there can be no question. All movements in the direction of right are always timely. The question of expediency is never to be thought of in a matter where right is clearly defined. It is man's imperative duty to do right, to labor for the right, though the heavens fall. When a man does what is right, and labors for the right, he can afford to leave results where they belong—with the great ruler of the universe.

We well remember reading in an autograph album over the signature of WENDELL PHILLIPS, the words, "Peace if possible; Justice at any rate." The impression those words made is with us to-day, and we hail any movement as timely that has for its object equal justice for all.

The subject of Civil Service Reform is one that we have been desirous of seeing agitated far more earnestly than the parties having it in charge have seemed able to do. For many years the movement had the appearance of a kid glove affair. A few men could get up and lecture about it, and a few others could write magazine articles, which read like essays about theories that could not be reduced to practice. To-day this is all changed, and the kid glove handling and theorizing have become things of the past in the passage of the PENDLETON bill, which is a fact of the present. We now realize that men are awake and in earnest regarding this movement.

The PENDLETON bill is but a first step as it were, in this great reform, which, if carried to a successful completion, will result in giving us an honest administration of government affairs. This is certainly a reform in which all business men are largely interested, and in the prosecution of it, the League should not be afraid of calling upon every business man to become a member, and to contribute freely of his means for its support.

Those of us who are brought in contact with the men intrusted with the management of government affairs, cannot help feeling that many are placed in their positions because they must be fed, and their influential friends cannot find food for them anywhere else. We have nothing to say about the buying power of patronage in the securing of voters, because we know that voters can be bought in almost any number, from a glass of beer up to a given amount of dollars. We do not expect that the obtaining of a civil service reform will do away with all the corruption attending the election of officers, but it will do away with a large part of it, and a rigorous law against bribery at elections vigorously executed may accomplish the rest.

We do not hesitate in inviting the readers of this Journal to give this reform their serious attention, and so far as in them lies, all the material help they can.

THE surveying party of the New York, Texas and Mexican road, locating a line from Rosenberg to Houston, reached the outskirts of the city August 7.

STRIKES.

WITHIN a few a days three strikes were in operation in New York City at the same time. That of the telegraphers commanded a good deal of public sympathy, and that of the "Progressive Union" cigar-makers, hardly any sympathy at all. The cloak-makers' strike was simply a refusal to work and starve to death at the same time. The fact that the cloak-makers could not live on the wages they were getting, was so patent to employer as well as to employé, that the strike was soon brought to an end, by the employers acceding to the demands made upon them. The other two strikes, so far, have not been successful. The "Progressive Union" has had to retract its demands, or meet with a lockout on the part of the manufacturers. The telegraphers have not yet brought the Western Union to terms, and it is claimed that the service performed by the Company is not much inferior to what it was before the strike. We are not in a position either to endorse or deny this claim. We think, however, that we are in a position to dicuss the right and wrong of strikes.

In the first place, we must ask the reason why a body of men strike. In the beginning of strikes, years back, the reason was given that it was labor protesting against the oppressive hand of capital. This was a very high sounding reason, and as capitalists were in the minority and laborers in the majority, politicians clamoring for votes, and newspapers dying for circulation were found, who gladly sided with the strikers, for the sake of winning their friendship. Such politicians and newspapers were not the true friends of the laboring man. The true friends were those who opposed them in their strikes, and they who oppose them to-day are truer, better friends than are the parties who pat them on the back. It is only needed to look at the different reasons for strikes as compared with the one reason of years ago.

From the reason then given, of labor protecting itself against the encroachments of capital, have grown all the other reasons. If men could combine and strike for that, they could combine and strike for other reasons,

The "Progressive Union" made a strike in a cigar factory because some members of the "International Union" were employed. There was no dissatisfaction as to hours of labor, quality or kind of work, or of wages paid. The only question was, that others than members of the "Progressive Union" were employed. Because the "International" was not the "Progressive," the former must go or the latter would organize a strike.

The other day there was a strike in a newspaper office in San Francisco. The *Call* employed some twenty-five or thirty printers, of whom only a part belonged to the trades-union. Nine of these printers did not belong, and would not join the trades-union. These nine men were

good workmen, and not objectionable in any way, except that they would not unite with the trades-union. The great question of what was to be done was solemnly discussed, and the conclusion reached that the trades-union men should "strike" for the dismissal of the non-union men, and they struck.

Strikes do not end here. They began with the cry of labor against capital; they have continued as explained above until it is now labor against labor, as well as labor against capital. They have gone farther. There are people living who remember the boycotting of grocery stores, for selling yeast cakes made by a firm whose hands had left them in an unsuccessful strike. It is not many months ago that liquor saloons were boycotted, unless they declined to sell the beer made by an obnoxious brewer. This striking business has gone still farther in manufacturers forming a union among themselves, so that when the hands strike in one shop they call a meeting and order a lockout in all the shops, until the strikers give in.

We think we have cited enough instances to show that when men can strike for one reason, it is very easy to find other reasons calling for the same result. We now discuss the question whether any body of men have the right to strike. We do not wish to discuss this question of right by making comparisons, for such are odious and do not prove anything.

It is now well established that civilized men possess two kinds of rights—natural rights and civil rights. The natural rights are common to all men, and can be classed under three heads; life, liberty, and the pursuit of happiness. But natural rights are not sufficient for men. Take a man and place him on the most prolific island, with everything to charm the eye and gratify the senses. He has all his natural rights—life, liberty, and the pursuit of happiness. But what are these worth to him if he is the only human being on the island? He will see many days when death will be preferable to life, and a dungeon preferable to liberty. As for the pursuit of happiness, he will look upon that as a chimera. He finds that to enjoy his natural rights he must have the society of his kind. He enters the society of his kind, and finds the advantages he did not have when alone. These advantages of protection, association, mutual helpfulness, are called civil rights. Now it is self-evident that in the attainment of civil rights, men must sacrifice to a certain extent the free exercise of their natural rights. A man has a natural right to his life, but the society of which he is a member has a civil right to that life for its protection, the same as he has a civil right in the exchange of his natural right to be protected by society.

A man has a natural right to liberty, but when he becomes a part of society, he exchanges this in part for the civil right of being protected from the natural right of liberty in others encroaching upon him. In this sacrifice of the natural right of liberty for his own protection, he is protecting others from an encroachment by himself on their right. He when alone learned that the pursuit of happiness was a chimera, and for the gratification of this natural right he has willed to forego in part his other natural rights, and find in good government and society that which could not be found when he was alone. Now every man entering society makes a compact, either open or implied, that he will surrender his natural rights in part, in exchange for the civil rights imparted by society. In doing this, he acknowledges that as men are constituted to-day, civil rights are absolutely necessary to the enjoyment of life, liberty and happiness,

That which he has entered society to receive, he must do his part to give. He stands as one part of a great whole. He has no right to cause suffering or distress. His mission is to contribute his quota to the life, liberty and happiness of the whole. Now apply this to strikers. At twelve o'clock noon, Washington time, a body of men leave their instruments with messages half sent, and the whole country is defrauded for a time of telegraphic communication. How many human hearts were wrung with anguish because they did not receive the expected messages from the sick and dying. How many business men were paralyzed because they could not hear from other centers of trade. These telegraph operators had a natural right to strike if they had not exchanged their natural right for the civil right of protection, but having made this exchange, they had no right to break their compact and entail needless suffering on that portion of society which happened then to be at their mercy. They were false to the community in which they lived, and which had protected them from the encroachments of others.

We are not bearing down on the telegraph operators, for we have no sympathy with watering stock and working men on small pay in order to pay dividends on watered stock, but we take the telegraph operators as an illustration, because they claim to be of better blood and higher intelligence than most classes that engage in strikes. The maxim in society is, that "no man has a right to do as he pleases, except as he pleases to do right," and it certainly is not right to cause suffering to innocent persons for the attainment of our own selfish purposes. These operators were probably not getting rich as fast as their employers, but they were not starving to death. As long as they were fed, clothed and housed, they had all they could claim, unless their own brains could show them the way to get more. Study this question of right from any standpoint, and but one conclusion can be reached, and that is that no man or body of men can rightly cause suffering for personal ends.

If this is true as between the strikers and the general

public, how much truer it must be between the strikers and their fellow laborers who do not wish to strike. If a man does not wish to work, let him withdraw, but do not let him force others to quit work, who would rather eat bread honestly earned than live in idleness on turkey given at the hand of charity. The suffering caused the outside public finds its counterpart in the homes of the poor strikers, where the wife and children have to go hungry to bed, while the lord and master is swelling around like some overgrown frog in a corner bar-room, thinking he is a great man when he refuses to take half a loaf because he cannot get a whole one.

We seriously think that the time has come when this question of strikes must be met in earnest. The railroads in times past have suffered terribly from strikes. State governments have been menaced, much money has been expended for damages, private enterprises crippled, men have been murdered, families compelled to suffer, criminals made, and a host of other crimes, calamities and misfortunes forced upon communities as the result of strikes. We do not mean to state that the strikers have not their grievances, but we do affirm as our belief, that they take the worst possible way to get redress.

We hope that very soon a better way shall be found; but if not, then that the strong arm of the law shall interpose and protect all classes.

We think, however, that all classes can be protected without the intervention of the Government. In the case of the strike of the Cigar Makers' Progressive Union, because one factory employed non-union hands, the action of the United Cigar Manufacturers' Association was very decided. They ordered a lock-out to offset the strike, and the consequence was that the strikers found themselves in the street, with every factory door of the Manufacturers' Association closed against them. It was not long before the strikers came to terms, and signed an agreement to work with non-union men. But in this lock-out great injustice was done, because it stopped the wages of poor men and women who were willing to work, and must work or starve. We think, therefore, that a fairer way to all concerned is, not to make a lock-out, because this is just as reprehensible as a strike, but to make a rule that when men strike they shall be discharged, not to be employed again. This does not take away the right every man has of getting the most for his services, but prevents him from dragging into idleness others who are contented to work. Such a course would prevent lock-outs, by which men and women are, without fault of their own, obliged to go hungry to bed. In the words of WENDELL PHILLIPS, "Let us have peace if possible, justice at any rate."

AN application has been received at this office for twenty-eight volumes of the AMERICAN RAILROAD JOURNAL, of dates ranging from 1831 to within about thirty years of its establishment. We are not able to spare these precious volumes from our shelves, containing as they do, a complete history of railroad development in this country, in years when the literature of the subject had no existence outside of these columns, or when the papers devoted to this most interesting branch of industrial information were exceedingly few. Throughout the more than half century during which the JOURNAL has been published, it has been eagerly read by the leading business men of the civilized world; and continues to be an authority on the subjects with which it deals, not the less valued by its countless readers because of the keen competition of this enterprising age. We confidently invite the comparison of current issues of the paper with those of the past, and of our contemporaries; and assure our friends that money, industry and journalistic ability will continue to be engaged in the future, as now and in the long past, to maintain the AMERICAN RAILROAD JOURNAL as a model paper of its class.

A FUNDAMENTAL improvement is reported from the works of the West Shore Railroad, but one which will not be found lasting, we fear, and while it endures, is practicable only in the case of a limited number of subjects. We refer to the ingenious way by means of which the contractors on the lines named, identify the Italians in their employment. The "linkéd sweetness long drawn out" of Italian patronymics, so suggestive of Southern indolence and leisure, possesses no such charms in the ears of said contractors as leads them to master the difficulties presented in their memorizing and pronunciation. They therefore substitute numbers for names in their identification of the Italians in their employment, these numbers being conspicuously painted on the most spacious portion of the trousers worn by the men. By the means stated, the history of each day's work is correctly ascertained, and the fear of arithmetical obliteration being ever before his eyes, the wary Italian avoids indulgence in excessive repose. There is no question as to the value of the practice described, in the education of the Italian laborer to a sprightly activity, and in its convenience to his employers; but, we opine, a difficulty precluding its possibility will arise at such time as the said Italian has developed a proper appreciation of his dignity as one of the sovereigns of the United States. The ignominy of being marked in a place sacred, even in the case of the convict's garb, from the desecration wrought by the painter's art, can only be borne by Italians in their undeveloped condition as Americans in embryo, so to speak. Who would venture upon painting the breeches of a gang of imperial Irish laborers, our future lawgivers and statesmen?

Numbered unmentionables must go.

SEVEN miles of track of the Florida Southern Railroad have been laid south of Ocala, and twelve miles of grading completed. There are 200 hands at work grading and 100 engaged in cutting cross ties, while sixty are laying track and finishing. The company is making strenuous efforts to increase its working force, in order to be in Leesburg by the 1st of November next.

RAILROAD MEDICAL SERVICE.

(Continued.)

BY S. S. HERRICK, M.D.

SECRETARY BOARD OF HEALTH, STATE OF LOUSIANA.

ITALY.

FOR information upon the railroad medical service of the Kingdom of Italy I am indebted chiefly to McWalter B. Noyes, Esq., the U. S. Consul at Venice; through whom copious materials, both manuscript and printed, have been furnished by the president of the Alta Italian Railway, Sig. Carl Alessandro B. Blumenthal. The following therefore relates specially to the railway system of Northern Italy.

Its medical service is under charge of twelve officers, styled sanitary inspectors, who reside at the most important points of the lines, as Turin, Alessandria, Milan, Verona, Udine, Bologna, Lucca and Savona. Their principal duties are as follows: to make physical examination of all applicants for employment; whenever employés are injured or fall sick, these officers have to inquire into the nature and gravity of the affection, and to report particularly when they find it expedient to grant leave of absence or to make final discharge from service; they watch over the course of the medical service, study its wants and suggest such improvements as they judge conducive to its perfection; they inspect quarterly the relief-chests distributed along the lines, provide for their replenishing, and recommend such changes as they find useful; they visit localities where epidemic or contagious diseases prevail, and report accordingly, advising measures suitable to the place and occasion. These officers are employed and paid by the railroad corporation.

Here it is to be noted that the employés of the company are organized into a mutual relief association (*Consorzio di Mutuo Soccorso*), for the purpose of affording medical relief and pecuniary assistance to members in case of sickness. This association employs physicians (*Medici Consorziali*) who reside in the towns and villages along the lines, most of whom are also in the service of their municipalities for attendance upon indigent cases. In the larger towns several physicians are under engagement to the *Consorzio*, and they number 614 in all. Most of them are paid fixed annual salaries by the *Consorzio*, and besides receive free passes from the railroad company for limited distances. Some receive fees according to service, in place of fixed salaries, and some both fees and salaries.

It is the duty of these physicians to wait upon all members in sickness or injury from accident, and in the latter case they must remain at the scene of disaster as long as their services are needed. At such times the telegraph is entirely at their disposal for ordering whatever is needed. They are required to keep a register of all cases treated and report the same to the *Consorzio* for the purpose of adjusting the expenses of the service; while they are under the general supervision of the sanitary inspectors of the company in their professional relations. In localities remote from a sanitary inspector of the company, the association physicians are required to report cases under treatment, with diagnosis and prognosis, in the same manner as the company's own medical officer.

Only those employés whose annual pay is less than 1,200 *lire* ($240) are entitled to membership in the *Consorzio*, the whole number of members being about 25,000. In case of injury from casualties of traffic, the company provides for those under higher salaries, being advised in such instances by the sanitary inspectors.

Whenever an employé is disabled by disorderly conduct, vice or wounds received in brawls, no pecuniary aid is granted, but he receives medical treatment. Drunkenness is less common than in colder climates, and rarely interrupts work.

The families of employés are not entitled to relief, either medical or pecuniary, from the company nor from the *Consorzio*.

The available funds of the *Consorzio* are composed: 1. Of a deduction of one per cent. of the pay of those who work for fixed monthly wages, and one-and-a-half per cent. of those who are paid by the day (such as workmen in the shops, about 5,000 in all); 2. Of a contribution by the railroad company of a sum equal to one-half the amount of these deductions; 3. Of all the fines imposed on the employés; 4. Of half the amount of deductions from pay for loss of time through sickness and leave of absence. These several sources yielded a revenue, during the year 1881, of 320,818 *lire* ($64,163.60).

The railroad company of Northern Italy has no hospitals of its own, but has special contracts with civil hospitals. The average daily expense of maintenance and treatment is 1.60 *lire* (32 cents), paid by the employé himself. The hospital sends its bills to the *Consorzio*, which reimburses itself by deductions from the wages of those treated.

This association is furnished by the railroad company with 200 relief-chests, which contain medicines, surgical instruments, and such dressings as would be needed in case of disaster upon the road. These boxes are distributed among the most important stations, and particularly wherever there is a reserve locomotive. Formerly they were carried in passenger trains, but it is found better to send the reserve locomotive to the scene of accident, carrying a relief-box, physician and assistants, so as to render the first relief upon the spot.

All employés in every branch of service are subjected to physical examination before engagement by the company. The medical examinations are conducted according to prescribed rules, and are entrusted to a commission composed of sanitary inspectors, assisted by a consulting ophthalmic surgeon. A careful examination is made of the visual sense, and particular pains are taken to detect color-blindness, which, however, is rarely found in Italy.

The sanitary inspectors and physicians of the relief association are charged with the sanitary supervision of the buildings, grounds, carriages, wells, cisterns, etc., belonging to the company; but practically this duty is neglected, except in time of epidemic disease, when the rules are strictly enforced. The hygienic condition of employés also is not well observed, except in case of sickness, when the attention of the medical attendant is specially directed to the subject.

There is also a Pension Fund (*Cassa Pensioni*), which was established in 1862, with 22,000 contributing members and a capital of about 24,000,000 *lire*. Its object is to grant stipends to employés disabled by sickness, injury or old age, and in case of death to their widows and their orphan

children under eighteen years of age. While independent of the *Consorzio*, before mentioned, it is supplementary, and they are entirely in harmony. It is sustained by deductions from the pay of contributing members, and an equal amount donated by the railroad company, besides some other sources of revenue. Further particulars of this association and of the *Consorzio di Mutuo Soccorso* are reserved for another article.

With regard to the transportation of live animals, they are loaded and unloaded by the consignors and consignees at their own risk. The animals are divided into five classes, and an ordinary wagon is limited to seven of the first class, eleven of the second and twenty of the third. Of the fourth and fifth classes, the shipper can load to the full capacity of the wagon. These rules, however, do not apply to trains running at low rate of speed. The company acknowledges no responsibility for damage to animals *in transitu*, unless the same is caused by disaster to the train, from collision, derailment or the like. The company makes no provision for food or water to be supplied to the animals *in transitu;* but if they are neglected on arrival at their destination, they are provided for by the company at the expense of the owners. As all ordinary risks fall upon the shippers, attendants are given passage upon the same wagons with the animals, for their greater security. In transportation of fowls, the shipper is required to place a vessel of water in every box which confines them, and the rules forbid these boxes to be overcrowded.

I have also received a report from the United States Consul at Genoa, consisting of brief answers to my list of inquiries. It is apparent that the medical service of Italian railways under his observation is less elaborate than that of the system of roads in northern Italy.

Mr. Francis reports that the railroad companies employ medical officers, at their own cost, who attend employés in ordinary sickness, as well as in case of injury, making no exception when the same is caused by drunkenness, brawls or venereal infection. No medical attention is provided for their families.

No contributions or deductions from pay are required for medical attendance, and no mention is made of benevolent associations among the employés. It is stated, however, that a percentage of wages is retained to sustain a fund for affording pensions to the families of employés after their death in service, or compensation to themselves in case of injury.

[TO BE CONTINUED.]

Recent Legal Decisions.

WALKING FROM A TRAIN WHILE ASLEEP.

A QUESTION, interesting to those holding accident policies of insurance, was recently decided by the Supreme Court of Wisconsin (Scheiderer vs. Travelers' Insurance Company). The action was brought against the company by a policy holder, who was traveling on a train of cars at the time of the accident. In his complaint he says that he fell asleep from weariness and the motion of the cars, and when it was quite dark, "and while he was in a dazed and unconscious condition of mind, and not knowing or realizing what he was doing, he involuntarily arose from his seat and walked unconsciously to the platform of the car, and without fault on his part fell therefrom to the ground," and received the injury complained of. The Court below held that no cause of action was stated, and dismissed the complaint. On appeal this decision was reversed. The Court, in the opinion, said: "The allegations of the complaint must be taken as true on demurrer, and it must be accepted as true that while he was in a dazed and unconscious condition of mind and not knowing or realizing what he was doing, the plaintiff involuntarily arose and walked unconsciously to the platform of the car, and, without fault on his part, fell to the ground. These are the strongest words that could be used to negative self-infliction, design or voluntary exposure, which are the only conditions (material to this case) to exempt the company from liability. From these allegations it is evident that the plaintiff was as irresponsible for his actions and conduct as a human being could be from any possible cause, and that is sufficient."

LIABILITY FOR LOSS ON RAILROADS.

In Leo vs. St. Paul, Minneapolis and Manitoba Railroad Company, the plaintiff shipped a car load of stoves at Chicago to be delivered at Moorhead, in Minnesota, and the transportation was necessarily made over several distinct railroads. When the car containing the stoves reached St. Paul, the defendant railroad received the car and billed it through to Moorhead without inspecting its contents. When the car reached its destination it was opened, and the stoves were found badly broken. The Supreme Court of Minnesota in holding the railroad liable said: "Where goods have been transported by several successive carriers, and it appears that they were in good condition when delivered to the first carrier, the jury may presume, in the absence of evidence to the contrary, that the goods reached the hands of the last carrier in the same condition as when delivered to the first carrier. The rule is not changed by the fact that the last carrier, instead of transferring the goods, transported them over its line in the foreign car in which it received them. We can see no distinction in this respect between goods transported by the car load in a locked car, and goods transported in a package mailed or otherwise fastened up. Of course we are not now speaking of cars in transit from a foreign country in bond and under the seal of the United States Custom House authorities."

STATEMENTS HELD OFFICIAL.

In Curry vs. Supervisors of Decatur County, the Supreme Court of Iowa decided that a public speech made by the president of a railroad company to the voters of a township, inducing them to grant a loan for construction purposes, may have very important legal bearings. It seems that the company proposed to run its road through the township of Franklin, in Decatur county, and made a request upon the township to vote a five per cent. tax to aid in constructing the road. To influence the vote the president of the road addressed the voters at a public meeting, and informed them that the road was to be laid as the surveys then ran. The voters authorized the tax, but the company altered the line of road. The plaintiff in this suit sought an injunction against the collection of the tax, which the Court granted. In its opinion the Court said: "We do not find from the evidence that the president made a representation in his speech which he

knew to be false, for the purpose of influencing voters to authorize the tax. Whether a party thus misrepresenting a material fact knew it to be false, or made the assertion without knowing whether it were true or false, is wholly immaterial; for the affirmation of what one does not know or believe to be true is equally, in morals and law, as unjustifiable as the affirmation of what is known to be positively false; and even if the party innocently misrepresents a material fact it is equally conclusive, for it operates as a surprise and imposition upon the other party."

RAILROAD BONDS.

In the Court of Appeals of Kentucky the case of Eminence vs. Grassar's executors presented another question as to the validity of railroad bonds. These bonds had been authorized by the town of Eminence, in Kentucky, and were issued in aid of the construction of a railroad. They were delivered to the company, who disposed of them to private purchasers. The recitals in the bonds, if true, were sufficient to show that the bonds had been issued by the proper authority and in due form of law. The town attached the bonds in suit because some of the forms of law had not been complied with, but the Court held the bonds valid in the hands of a purchaser in good faith. The Court, in its opinion, said: "Good faith demanded of the taxpayers and officials of Eminence, who were the agents of the taxpayers and acting for them, that they should have suggested the defects of proceedings, if any existed, instead of using language on the face of the bonds which implied that no such defects existed." And the recitals constituted what the Court termed an equitable estoppel—that is, that the town ought not in equity to be heard to impeach the validity of that which by the recitals was said to be valid.

Pneumatic Tubes for Postal Business.

THE scheme to establish a pneumatic tube four inches in diameter between New York and Chicago challenges public interest. Small pneumatic tubes to convey messages for short distances have become almost indispensable in certain places, and great advantage is expected to result from the establishment of connection by pneumatic tubes between the Western Union building and the branch telegraph office in Twenty-third street. Large tubes have also been used in London and Paris with satisfactory results for several years, the tube two and a half feet in diameter which was laid in the former city in 1861 having conveyed a carriage weighing 700 pounds at the rate of thirty miles an hour; but the tube was only a quarter of a mile long. It is uncertain whether the pneumatic system can be profitably worked at so great a distance as that from New York to Chicago, but the experiment is likely to be tried, it is said. As pneumatic tubes four feet and a half in diameter and several miles long are now in use in London, it may be worth while to repeat a suggestion made by us two or three years ago, that pneumatic tubes be used to convey letters between the postal stations in New York city. The time of delivery would be greatly reduced were the suggestion adopted.—*Mail and Express.*

GIVE a boy address and accomplishments, and you give him the mastery of palaces and fortunes wherever he goes. He has not the trouble of earning or owning them; they solicit him to enter and possess.—*Emerson.*

Communications.

COMMUNICATIONS are solicited for this department on all subjects pertaining to Railroads, Steam Navigation, Machinery, Manufacturers, etc. No attention will be paid to communications unless the name and address of the writer is furnished us, though if desired, they will be withheld from publication. We assume no responsibility for statements made by correspondents, and we do not necessarily endorse ideas advanced by them. Under these conditions we think it of value to our readers to devote a liberal space to the free discussion by others—whose opinions may be at variance with our own—of subjects pertinent to this department of the AMERICAN RAILROAD JOURNAL.

NEW YORK, August 8, 1883.

American Railroad Journal, New York:

While on a recent Southern trip, the writer was pleased to notice so many signs of enterprise and prosperity on all sides. Even the careless traveler cannot fail to observe the spirit of improvement which seems to have taken hold of business, and a thoughtful mind will seek to explain, to his own satisfaction at least, the reason or reasons—for there are certainly many contributing to this awakening of commerce—of this trade revival. It is plain to be seen that there exists in many parts of the South a healthful competition among all classes, and we know of no other way by which the grand resources of the South can be better brought out and exhibited to the world, than by this strife and commercial warfare among her own citizens. That the South is rich, no one will or can deny; rich by nature, rich by tradition and associations, rich in prospective values, and richer still in the grand possibilities in store for her, when her mines, her forests, her fields and her rivers are touched by the magic hand of commerce. It has been said that "the South has a great future before her." There is nothing that will hasten the coming of the "New South" more, or in fact so much, as the Railways which cover her, and which are being rapidly extended from year to year.

To say that the railways are assisting to bring out these results, is perhaps doing scant justice to them. They can justly claim to be the *leaders* of this grand movement, and whatever their objects or motives are, whether power, glory or gain, the country should say *amen* to their intentions and plans. For, judging them by results, according to the sacred rule, "By their fruits ye shall know them," they are accomplishing great good, and are therefore entitled to the credit of it. In other lands it has been found that to civilize a country—which is the modern term for conquering or possessing it—the locomotive is a far swifter agency of civilization than any other; other agencies, other forces and other influences always follow.

In condemning the heads of these great railway systems—and many of us find great happiness in so doing—it should be borne in mind that they (the "heads") represent but *one* in a vast army; the voting power extends clear along the line, though subject, of course, on all important points, to the one ruling mind; and while the machinery, as a whole, must move according to the instructions of the "chief," yet it is to his interest and to the interests of all, to serve the public to the best of their ability.

The law of competition, which in other branches of trade prevents prices from being made too burdensome to the people, operates here also, and this factor alone would serve to repress any men, or set of men, from per-

manently fastening impositions upon the public—they might do it for a time, but in the long run, after public opinion is once aroused, the "right must gain" the day.

It is not to be supposed, however, that good grounds do not exist in many cases, justifying censure and complaint. But they are the *exceptions*, and not the rule. Here and there the laws of Nature seem to bear heavily upon certain things, and even *persons* complain at times when their health or worldly affairs seem to be disjointed. It is recognized, however, even in this skeptical age, that Nature's laws, though arbitrary, are always just. It is hardly to be expected that some one will not come to the front, from time to time, claiming to be able to improve and modify them to advantage. We recall the reply made by one of our well-known American orators (who uses his "silver tongue" for divers objects, and at a profit, which he has a perfect right to do), when asked by one who believed that the world was modeled upon a Divine plan, to mention one single way by which Her laws could be improved upon, replied that he would make health catching instead of disease. Had the eloquent gentleman unfolded his entire theory of a universe and the manner in which he would have it governed, probably none of his hearers would have cared to have this feature changed, if the change was conditioned upon a substitution of his full plan; inasmuch as in the "modern plan" contagious diseases, ending in death, might prove to be a happy relief.

We have only time to point to a single road as an illustration of this activity observable throughout the "New South." The main line of the Chesapeake and Ohio Railroad extends from Lexington, Ky., to Newport News, Va., a distance of 644 miles. It in turn forms but a single link in a larger system, whose tables and schedules are arranged to fit in those "notches" which an interchange of business and traffic demands. Newport News is the "Ocean outlet" of this road, and is where it finds good grounds for competing for a portion of the foreign trade.

This road has constructed at this point a giant warehouse, or more properly speaking, a merchandise wharf, 800 feet long. It would be difficult to match this pier, and certainly but few places, if any, can boast of a better one. In size, strength of construction and general arrangement, it seems to be all that can be desired, and in connection with the other piers and warehouses for the accommodation of freight—constructed and in course of construction—appears to be able to take care of whatever demands a growing traffic may require of it. The evidence of growth which one here and elsewhere sees, should convince even the "croakers" that the builders repose the greatest confidence in the future of this road. We must confess that it seems somewhat strange to find large steamers here receiving their cargoes for distant ports, for at present the eye can only see the road and its various buildings. Newport News, however, is an established place, appearances notwithstanding. The merchant is accustomed to frequently superscribe his envelope to a foreign correspondent, "via Newport News," thus dissipating whatever doubt he may have of its existence. It has been claimed, and the papers have made the announcement to the world, that they are calculating to make it a serious rival to New York; things have been fashioned for such a competition; at any rate, freight can certainly be handled here in the quickest and least expensive manner. The land round about, so we were told, ten miles along the water front and about five miles back, has been bought up by the company, and towns and cities are expected to spring up at its bidding: "Corner lots for sale at fair prices?" The germs are here, and if anything can develop them, an enterprising road is the power to do it. Mr. C. P. Huntington is the head of this system. Such is the way by which men "cast in large moulds" spread themselves over this great country. It is rare, however, for men who plan these great works, or in fact any great enterprise, in which the world has an interest, to live to see the full fruition of their aims, for the span of life is too narrow to permit the directing hand to guide its project through to the end. This "stopping off point" does not necessarily depend upon death, for in this fast age, where each one seems to be fighting the world—mankind and their forces, all leagued against him—the *limit* is reached when least expected, and tired nature demands a rest. To disregard the summons, means death,—and yet how many have, during the past, signed their own death-warrant in this way, and others "of a wiser generation," unwilling to see the finger of Fate, are pursuing the same course.

There is one more point to which attention might be drawn, which is that the "New South" is fast becoming the "garden" for the Northern markets. If any one doubts this, let him take a trip over the Old Dominion Line, and see the vast quantities of produce and "small fruits" being carried to the New York markets, there to be distributed to the hungry districts, far and near. If further proof is wanted, ask your Long Island, New Jersey and Connecticut farmers how this stream of southern produce is affecting them. They will probably tell you that every year this competition from the South is becoming stronger, and that the "margins" can not be counted on with the same assurance now, as in former years. The cheap rates for transportation by water are largely, if not altogether, chargeable for this condition of things, and the farmers are taking full advantage of them, both to their own profit and the profit of the steamship companies.

When these favorable freight rates are put before us, we can understand "why farming at a distance pays." These same rates, if given to a city expressman for carrying goods across the city would soon bankrupt him, he would claim, and tend to make him apprehensive for his chances, both in this world and the next.

You will doubtless be glad to learn that your JOURNAL, under its new administration, is making a very favorable impression among railway men, and I have found that the liberal way in which it is now managed is fully appreciated by them. With best wishes for the future of the JOURNAL, I remain, Yours truly,

HOWARD BARNES.

A WRITER in *The Century Magazine* says: "Who can estimate the value of the work petroleum has done in twenty-three years for intelligence, culture and the household virtues? It has made the evenings bright and cheerful in millions of homes. The luminous lamp invites to study and reading, to social games and music, to good conversation, to wit and merriment. In a word, it is a powerful force in the advancement of civilization—a force which the social scientists, who have so much to say about railroads and electricity, rarely take into their account of the world's progress."

Chicago, Rock Island and Pacific Railway.

THE earnings of the Chicago, Rock Island and Pacific Railway Company for the years ending March 31, 1882 and 1883, were as follows:—

	1882.	1883.
From passengers	$2,853,331 18	$3,333,069 30
From freight	9,678,097 13	7,928,236 50
From mail	215,216 42	203,344 20
From express	140,400 00	142,288 30
From rents, interests, etc	260,527 36	441,025 49
From car mileage	97,038 15	129,261 59
From telegraph lines	13,032 86	12,677 53
Total earnings	$13,266,643 10	$12,189,902 81
Expenses, viz:—		
General office, salaries, etc	$189,801 45	$191,147 85
Legal expenses	40,797 52	40,109 65
Books, printing and stationery	57,633 28	62,567 29
Outside agencies and advertising	255,348 87	345,709 39
Agents and station service	812,201 81	872,734 75
Station supplies	90,838 89	89,884 64
Telegraph expenses	117,709 57	121,142 68
Water supply	70,495 38	59,589 00
Repairs of engines and tenders	378,798 40	370,758 92
Engineers, firemen and wipers	648,596 76	629,826 77
Fuel for Locomotives	700,167 34	664,652 37
Oil, tallow and waste	53,349 95	46,119 86
Repairs passenger cars	104,277 56	152,638 52
Passenger train service	121,038 94	142,454 11
Passenger train supplies	21,154 51	23,042 94
Passenger car mileage	2,935 03	12,677 16
Dining car expenses	72,737 27	93,161 50
Repairs freight cars	554,618 99	543,169 78
Freight train service	291,202 96	267,618 61
Freight train supplies	43,597 99	40,911 91
Freight car mileage	192,956 64	136,840 92
Renewal of rails	210,061 24	121,703 78
Renewal of ties	202,043 66	203,316 10
Repairs of roadway and track	948,612 01	946,299 68
Repairs fences, crossings, etc	45,351 88	46,233 34
Repairs bridges, culverts, etc	244,126 08	239,349 32
Repairs of buildings and fixtures	265,195 35	106,759 64
Loss and damage of goods and baggage	37,192 19	30,135 10
Injuries to persons	66,700 12	51,652 28
Cattle killed and damage to property	59,049 68	31,855 00
Contingent accounts	91,475 45	68,054 90
Tax account	332,795 79	356,689 60
Total expense	$7,332,862 57	$7,109,816 38
Net earnings	$5,943,780 53	$5,080,086 43
Balance from previous year	238,201 02	290,084 89
Sale of bonds held by the sinking fund	13,200 00	.....
Receipts from Land Department	650,000 00	560,000 00
Total net income	$6,845,181 55	$5,930,171 32
Disbursed as follows:—		
Four quarterly dividends of 1¾ per cent. each	$2,937,186 00	$2,937,186 00
Interest on Chicago and Southwestern bonds	350,000 00	350,000 00
Interest on U. S. 4 per cent. bonds	600,000 00	600,000 00
Rental Hannibal and St. Joseph Railroad	37,568 28	38,153 04
Rental Keokuk and Des Moines Railroad	165,025 26	141,209 70
Rental Peoria and Bureau Valley Railroad	125,000 00	125,000 00
Tolls paid Missouri River Bridge Co	125,317 12	145,595 40
Addition and improvement account	21215,000 00	1,300,000 00
Balance, March 31	290,084 89	291,027 18
Total as above	$6,845,181 55	$5,930,171 32

During the fiscal year ending March 31, 1881, the gross earnings were: From passengers, $2,500,135.22; from freight, $8,690,480,71; from mail, $188,913.96; from express, $133,393.97; from rents, interest, etc., $341,797,53; from car mileage, $92,362.74; from telegraph lines, $9,824.15—total, $11,956,907.64; the expenses during the same time (including $288,672.82 for taxes) were $6,629,955.16, and the net earnings, $5,326,952.48.

Compared with the year 1880–'81, the gross earnings of 1881–'82 show an increase of $1,309,735.46, with an increase in expenses of $692,907.41, making the increase in net earnings $616,828.05. Comparing in like manner the business of 1882–'83 with that of 1881–'82 shows a decrease in gross earnings of $1,076,740.29, with a decrease in expenses of $213,046.19, making the decrease in net earnings $863,694.10. The percentage of expenses to gross earnings were: In 1881, 55.45; in 1882, 55.20; in 1883, 58.33.

During the year ending March 31, 1882, the mileage of roads owned by the company was increased 26.4 miles by the completion of the river line from Davenport to Muscatine, making a total of 1,381 miles operated at the close of that year—the average mileage for the year being 1,365 miles. No additions to the mileage of the main line or branches were made during the year ending March 31, 1883. At that date the roads owned, leased and operated by the company were as follows:—

		Miles.
Main Line,	Chicago to Council Bluffs	500
Kansas Line,	Davenport, Iowa, to Atchison, Kansas	345
Leavenworth Br.	Atchison Junction to Leavenworth, Kansas	21.5
Kansas City Line,	Cameron, Mo., to Kansas City, leased	54
Oskaloosa Br.	Washington, Iowa, to Knoxville	77.5
Peoria Branch,	Bureau Junction to Peoria, leased	46.5
Branch Line,	South Englewood to South Chicago	7.5
Branch "	Wilton to Muscatine	12.5
Branch "	Newton to Monroe	17.5
Branch "	Des Moines to Indianola and Winterset	48.1
Branch "	Menlo to Guthrie Centre	14.6
Branch "	Atlantic to Audubon	25.5
Branch "	Atlantic to Griswold	14.6
Branch "	Avoca to Harlan	12
Branch "	Avoca to Carson	17.5
Branch "	Keokuk to Des Moines, leased	162.2
Branch "	Mt. Zion to Keosauqua	4.5
		1381.9

—of which the company owned 1,128½ miles, and leased 252½ miles, located in the following States: 236 miles in Illinois, 920 miles in Iowa, 223 miles in Missouri, and 2 miles in Kansas; in addition to which there are 140 miles of second track and 263¾ miles of side track, equal to 1,783¾ miles of single track.

At the close of the fiscal year 1881–'82 (there having been added during the year 6 locomotives and 598 cars of all kinds) the equipment consisted of 296 locomotives, 17 sleeping-coaches, 117 passenger coaches, 39 baggage, mail and express cars, 6 railway postal cars, 6 dining cars, 2 officers' and paymasters' cars, and 7,499 freight, stock, coal, etc., cars, and 666 cars used in repairs; and at the close of the fiscal year 1882–'83, (13 locomotives, 8 passenger, 2 sleeping, 2 railway post-office, and 50 box freight cars having been added during the year) the company had 309 locomotives, 127 passenger coaches, 19 sleeping-coaches, 41 baggage, mail and express cars, 8 railway postal cars, 6 dining cars, 2 officers' and paymasters' cars, and 7,499 freight, stock, coal, etc., 2 cars, and 675 cars used in repairs.

The number of miles run by the passenger trains during the year 1882–'83 was 2,367,731; by freight trains, 6,623,435; by wood, gravel and construction trains, 701,512—total, 9,692,678, against 9,970,423 during the year 1881–'82, a decrease of 277,745.

The total number of passengers carried in 1882–'83 was 2,784,722, of whom 2,707,025 were first class, 43,491 second class, and 34,236 emigrant; 80,682 were through, and 2,704,040 way passengers; 1,349,066 went east and 1,435,656 west. The total number carried in 1881–'82 was 2,636,258, showing an increase of 148,464. The number of passengers carried one mile in 1882–'83 was 133,134,280, against 113,894,522 in 1881–'82, an increase of 19,239,758. This is equivalent to carrying each passenger 48 miles during the past year, against 43 miles during the previous year. The average rate per passenger was, in 1882–'83, 2.504 cents; and in 1881–'82, 2.505 cents; the average amount received being in the former year $1.19½ and in the latter $1.08¼.

The amount of freight transported during the past year was 6,909,775,184 pounds, against 7,509,063,136, in the previous year, a decrease of 599,287,952. The total paying freight carried one mile in 1882–'83 was 677,731,319 tons against 756,051,981 tons in 1881–'82, a decrease of 78,320,662 tons. The average rate per ton being in the past year 1.17 cent and in the previous year 1.28 cent.

During the past year, 25 miles of second track have been

constructed and brought into use. A continuous double track from Chicago to Bureau Junction, from Genesee to Rock Island and 4½ miles west from Davenport, is now used, a distance in all of 140 miles.

There have also been constructed 2 miles of new railroad, including a bridge across Des Moines River, to bring the Des Moines, Indianola and Winterset Branch Railroad into the city of Des Moines. The bridge is 625 feet in length, with stone abutments and piers. An addition of 14.75 miles of side track has been made to meet the demands of traffic.

The amount charged to construction account during the past year was $675,091.66, and to equipment account $173,730.12—a total of $848,821.78. The amount charged for similar purposes in the previous year was $1,403,246.69.

Of the $2,500,000 bonds reported as assets in the last annual report, $700,000 have been sold at the market rate, and the avails invested in stock and bonds of connecting and other railroads for the protection of this company's interest.

The Land Commissioner reports that there have been sold during the year, 27,306.70 acres of land for $278,513.28—the average price having been $10.20 per acre. The bills receivable now on hand amount to $1,403,482.57, a decrease during the year of $187,151.70. The total receipts for interest, etc., were $99,444.78. The amount charged tax account was $8,254.70. The sum remitted to the treasurer at New York during the year from the net receipts of the land office amounted to $560,000. The remaining unsold lands of the company, April 1, 1883, consisted of about 34,750 acres, a large proportion of which, however, is composed of scattered tracts, and of rough or hilly land; notwithstanding which it is anticipated that these lands will soon be disposed of at better prices than the most desirable land in the same neighborhood could command a year or two ago.

BALANCE SHEET, APRIL 1,

	1882.	1883.
Capital stock fixed, $50,000,000; amount issued.	$41,960,000 00	$41,960,800 00
Six per cent. mortgage coupon bonds	7,270,000 00	6,950,000 00
Six per cent. mortgage registered bonds	5,230,000 00	5,550,000 00
Chicago and Southwestern bonds guaranteed.	5,000,000 00	5,000,000 00
Addition and improvement account	4,500,000 00	5,800,000 00
Suspense account	8,913 37	10,149 54
Profit balance of income account	290,084 89	291,027 18
Total	$64,258,998 26	$65,561,176 72

	1882.	1883.
Cost of road and equipment, including all Branch roads owned by this company	$56,871,850 90	$57,720,672 68
Cost of Railroad Bridge at Rock Island	758,526 10	758,526 10
Capital stock and bonds of connecting roads.	2,542,497 97	3,508,210 93
Loans payable on demand and cash in New York	1,156,838 40	1,415,299 39
Six per cent. Chicago, Rock Island and Pacific bonds	2,500,000 00	1,800,000 00
Due from Post Office Department	49,998 81	56,133 27
Stock of material, fuel, etc., on hand	212,498 00	275,739 19
Cash and balances due from other roads in hands of local Treasurer, Chicago	166,788 08	26,595 16
Total, as above	$64,258,998 26	$65,561,176 72

President and General Manager—R. R. CABLE.

Vice President—DAVID DOWS.

Directors—David Dows, Francis H. Tows, A. G. Dulman, James R. Cowing, Sidney Dillon, Jay Gould, R. P. Flower, Benj. Brewster, H. R. Bishop, New York; Hugh Riddle, H. H. Porter, Chicago; R. R. Cable, Rock Island; George G. Wright, Des Moines, Iowa.

General Superintendent—A. KIMBALL.

Secretary and Treasurer—FRANCIS H. TOWS.

Gen'l Ticket and Passenger Agent—E. ST. JOHN.

Gen'l Freight Agent—WM. M. SAGE.

Purchasing Agent—F. A. MARSH.

Tramway.

THIS department of the AMERICAN RAILROAD JOURNAL is devoted to the interests of Street Railways; and communications, suggestions and items of information relative to their organization, management and appliances are solicited by the editors. All communications should be accompanied by the name and address of the writer. The English nomenclature of "Tramway" is adopted in this department as being of greater convenience and more specific in its meaning than "street railway," though in allusion to individual organizations we shall preserve their corporate titles. It is our hope to nationalize the term Tramway, which is now generally used in every English-speaking territory with the exception of the United States.

THE STREET RAILROAD PROBLEM.

INDICATIONS reach us that there is widespread dissatisfaction with the use of horses or mules in the traction of street cars. The conviction seems to be general that the time has come when this system should be superseded by one less expensive, simpler, more rapid and more humane. On this last point, the refined sensibility of the age is disposed to condemn, perhaps with inadequate consideration, the employment of horses under the hard conditions of weary distances and the strain of frequent stoppings and startings. In hot weather, especially, the woes endured by car horses appeal with greater emphasis than ordinary to the feelings of a generous public. And indeed the sight of numerous animals lying dead or dying in the streets of this metropolis, may well set people to thinking whether or not the proper exercise of man's unquestionable right to the services of the brute creation, includes that of taking the horse from his stall and driving him in the blazing sunshine until he drops on the track. But how consistently with reasonable convenience can the car horse be superseded?

Generally speaking, experiments of the past, looking to this consummation, have not favored the hope that it will happen at an early period. The industrial history of the past few years records a remarkable list of failures in the attempt to discover some means of dispensing with the suffering car horse, recommending itself to general adoption. Our well-informed contemporary, the *Car-Builder*, has taken the trouble to give this list as follows: "There was the Remington car, which was tried in 1873. It had a Baxter upright boiler on the front platform, and carried sixty passengers on the Bleecker street line in New York, rounding the curves and getting over the grades beautifully, having a noiseless exhaust and consuming only five pounds of coal per mile. In 1876, the Baldwin Locomotive Works built a steam car for the Atlantic avenue road, in Brooklyn, which was pronounced to be a great success by members of the city council, mechanical experts and others, the trips being made in half the usual time with one or two other cars attached to the steam car. Then there was the Angamar steam car, which made regular trips on the New York Third Avenue line for a period of two months in the summer of 1879. On the front plat-

form was a small furnace and boiler. The requisite quantity of hot water was supplied from a stationary boiler at the starting station, and by throwing a few shovels full of live coals into the furnace, steam was generated sufficient for the trip without carrying any extra fuel. The working parts of the engine were underneath the car and hidden from view by side aprons. This car was under better control than horses; could do, as was claimed, a quarter more work of itself, besides hauling two other cars if necessary, and withal could be run cheaper than horse cars. The Ransom steam street car, built by Gilbert, Bush & Co., in 1877, was also a very complete affair, and performed excellent service, according to report, on the Market Street Railway of Philadelphia. Then there were a number of compressed air motors, similar in their design to the Mékarski system which is now attracting some attention in Europe. In France, the Paris Tramway Company has within the last five years experimented with twenty different systems for applying steam as a motor upon street railways, but without success." We are not aware that the condensed-air engine of Major Beaumont, of the British army, has received a proper trial in this country. Certainly, whatever its merits may be, the tramways of English towns are still strangers to it. The expectation of finding a motor to supersede horses on street lines may find its solution in the invention, by M. Faure, of the storage battery. It has been demonstrated that this invention is adaptable to supply a continuous and uniform motive force, and one under control; but whether its general use in street cars is practicable or not remains to be shown. In case it should be found so, its introduction would involve no extraordinary annoyance from interference with the streets, which would be necessary in order to accommodate the apparatus used in running cars by cable. At the same time, as we have shown in several recent numbers as well as in this, the cable system possesses advantages which are appreciated where it has been tried. The claim for it is—and figures and facts seem to demonstrate the claim—that money is saved and the public better served by means of the cable than the horse system; but the awkward fact still remains, that after ten years of use, the cable system seems to be approximately as far from reaching general preference as ever. Its adoption as the motor on the bridge between New York and Brooklyn is the latest instance to our knowledge; and, at the time of this writing, the success or non-success of the experiment is not predicable. Why said experiment is a solitary one east of Chicago is something we wish to know, and we shall be pleased to hear from any one able to inform us on the subject. Street car corporations, as the list of experiments quoted above shows, are not slow to test what promise to be improvements.

Perhaps their inaction in the matter under consideration is due to the great cost which would be incurred in the adaptation of the street to the innovation. If this is the case, the enterprising proprietors of cable-car systems will find their profit in preferentially procuring its adoption, as generally as possible, by corporations and companies engaged to provide new street railroads. The building and enlargement of cities give such persons opportunities of enterprise in this direction, which, if made the most of, cannot but result, so far as we can see, in the increased number of roads run by the cable system; and its general availability in the case of new roads would prove the first step towards its universal adoption. Now, more than ever before, the short-comings of the horse system are conspicuous; and out of the dissatisfaction consequent thereupon, there surely will be evolved, at an early date, something to supersede it, whether by the employment of the cable, electricity, compressed air, or other means.

R. F. Bridewell's Cable Road.

WE have found an illustrated pamphlet on the above subject, quite interesting reading. Its subject is increasing in importance every day, and our readers will appreciate the statement of a few facts from the little book under review. We presume that R. F. Bridewell, No. 1,606 Leavenworth avenue, San Francisco, will mail a copy in response to a request for it, from any place in either Europe or America.

The Clay Street Hill Cable Road, San Francisco, was the first built. It was begun ten years ago, is in use to-day, and is so far from being superseded, that cable roads are becoming almost numerous. Inquiry as to their construction and operation is keen both on this continent and in Europe.

Mr. Bridewell's new system introduces his six patents, which we can do scarcely more than name, referring the reader to the very adequate and pleasing description contained in the pamphlet which suggests these few sentences. It provides an underground rail-bed; a grip which works automatically over all cross cable roads, without the aid of a driver, which can be stopped over the engine house and started as readily as on any part of the road, and which will cross its own cable or any other; unique and efficient engine-house machinery for propulsion; an indicator and advertiser, the cars being provided with two endless bands placed at the top of them, and which are made to receive cards, one-half showing the names and numbers of all the streets to be crossed on the road and the other half advertisements; apparatus for turning corners and curves safely and expeditiously, and an air-brake and starter.

These are the principal features of a system which justly claims the intelligent examination of everybody interested in providing a rapid, economical and safe substitute for the horse-car system of street railways.

Step for Street Cars.

A NEWLY-PATENTED step for street cars is worthy of attention. It is the invention of Beeason J. J. Townsend, of St. Louis, and consists in making the rear step of a

one-ended car to slide beneath the same, the step being advanced or retracted by a device operated by the driver on the front platform. Longitudinal cleats are attached to the under side of the car body. These have upon the inner sides a rabbet groove to receive the edges of a sliding frame to which the step is attached. The under side of said rabbet groove forms a flange which is provided with slots or recesses. These receive anti-friction rollers or wheels, upon which the frame connected with the step is supported in such a manner that it can be easily pushed backward and forward. The rear end of a rod is attached to the frame already mentioned, and its front end to a lever by means of a hinge-joint. Said lever is supported on a fulcrum, and extends from it downward through a slot in the floor of the car, and upward to a convenient position for the hand of the driver. The lever has near its upper end a drop-catch, securing it in place when its upper end is in its forward position, and the step projected behind the car body. This catch has an upwardly-extending handle by which it can be raised to free the upper end of the lever for its backward movement to draw the step beneath the car. A fixed guard is provided, which descends in close proximity to the top of the step for the purpose of preventing the toe of a passenger from catching between the step and the car body.

Mr. Townsend's device is effective against unauthorized persons riding on the car step, especially children, whose pranks on the "bob-tail" are dangerous to themselves, and a source of inconvenience and danger to persons getting on and off the car.

THE president of one of the Boston horse railways is trying to apply the civil service reform rules to his employés. The other day Job Doolittle, a green down East chap, walked into the office and asked if they wanted a conductor. The president said no, and that they had one hundred applicants waiting for a chance. The president asked him what he knew about the duties of conductors. Job said in reply that he never saw a horse-car until he came to Boston, but he had been packing sardines down in Maine for two years, and if that was not a good training he did not know what more was wanted. The president, it is needless to say, put him at the head of the list of applicants.—*Harper's Drawer.*

SAMUEL G. ERNST, a piano tuner, of Cleveland, failed to get a through car on the East Cleveland Street Railway in going to the East End a few days ago. After riding to the barns he got on the next east bound car and the conductor asked him for his fare. He refused to give up the desired nickel on the ground that he should not be compelled to pay double fare because he was unfortunate enough not to catch a through car, and having besides already paid five cents for his ride. Ernst would neither pay, nor get off the car, but gave the conductor his address and was afterwards arrested on a warrant. The case was tried in the Police Court and Ernst was fined $5 and the costs, the court holding that the railroad company were justifiable in doing their business in the manner to best meet the wants of the largest number of their patrons, and to prevent themselves from being defrauded. The case will probably be appealed to a higher court.

List of Recent Patents for Inventions Relating to Tramways.

BEARING DATE JULY 3, 1883.

280,384. RAILWAY OPERATED BY UNDERGROUND ROPES: Joel B. Low, San Francisco, Cal., assignor of one-half to William B. Reaney, Baltimore, Md. Filed Sept. 9, 1882.

280,450. CAR-STARTER: Henry Clark, Milwaukee, Wis., assignor of two-thirds to Frank W. Erbacher and Christian Helms, Jr., same place. Filed May 7, 1883.

280,658. HORSESHOE: Joseph Nester, Wapakoneta, Ohio. Filed May 26, 1883.

280,739. HARNESS-SADDLE: J. Theodore Gurney, Boston, Mass. Filed April 6, 1883.

BEARING DATE JULY 10, 1883.

280,816. HORSESHOE: Arnold C. Hawes, Noroton, Conn. Filed Jan. 30, 1883.

280,819. HORSESHOE: Gustavos Heidel, St. Louis, Mo. Filed Feb. 28, 1883.

280,883. STEP FOR STREET-CARS: Beeason J. J. Townsend, St. Louis, Mo. Filed March 8, 1883.

280,889. HORSESHOE: John W. White, Dedham, Mass., and James C. Farmer, Providence, R. I. Filed May 14, 1883.

280,924. GONG-BELL: William S. Foster, Richford, Vt. Filed April 9, 1883.

280,925. PASSENGER-REGISTER: John W. Fowler and Daniel F. Lewis, Brooklyn, N. Y. Filed May 28, 1883.

281,080. BLINDER FOR BRIDLES: Dominick Kaltenbacher, Shelbyville, Ky. Filed Feb. 14, 1883.

BEARING DATE JULY 17, 1883.

281,256. TRACTION-ROPE RAILWAY: Charles F. Findlay and Daniel J. Miller, Chicago, Ill. Filed March 31, 1882.

281,284. TRACTION-ROPE RAILWAY: Daniel J. Miller and Charles F. Findlay, Chicago, Ill. Filed Aug. 1, 1882.

281,501. HARNESS-SADDLE: Benjamin J. Hartman, Wooster, Ohio. Filed March 3, 1883.

BEARING DATE JULY 24, 1883.

281,932. HORSESHOE: Ephraim Simar, West Union, Iowa, and Vine Dorance Simar, St. Paul, Minn. Filed Oct. 2, 1882.

281,952. HALTER: Ransom H. Armstrong, Hudson, Mich. Filed April 2, 1883.

BEARING DATE JULY 31, 1883.

282,108. HORSESHOE: Robert O'Hara and Charles H. Remington, Gilroy, Cal. Filed May 12, 1883.

A NEW bridle attachment has been invented by John C. Massey, of Round Mountain, Texas. It can be used with or without bits, and consists of a nose-clamping strap having end rings through which pass the ends of a chin strap, connected by rein straps passing through rings of a head strap of the attachment, which is connected with the crown strap of the bridle. The invention also comprises a connection of the martingale straps with the rings of the nose-clamping straps, whereby the attachment may be used for both driving and riding, to powerfully check up the horse when required, and also to prevent his rearing and plunging, by producing a pressure on his nostrils to cut off his breath.

WHEN you enter a crowded bob-tailed car it is agreeable to have a fellow passenger who is standing or sitting near the fare box take your nickel and put it in the box. But it is not conducive to the prosperity of the company owning the car to have the obliging passenger put the nickel in his pocket. A man was sentenced to the penitentiary for eighteen months recently, for enriching himself with a five-cent fare in this fashion in a car of the Twenty-third street line, New York City. He is said to have made a business of this shabby stealing, and to have reached the highest point of adroitness in his line.

LITERARY NOTES.

The Eighth Annual Report of the Railroad Commissioners of the State of Missouri, being for the year ending December 31, 1882, consists of nearly two hundred pages. The number of new companies organized during the year 1882 is twelve. Of these companies, the Springfield & Southern put 19 miles in operation, and the St. Joseph & Nebraska completed their line from Napier to Rulo, Atchison county, and leased same to the K. C., St., Jo. & C. B. Co. The Doniphan Branch railroad was completed early in 1883. Among the most important combinations of existing lines, within the State, were the perfection of the lease of the Missouri, Kansas & Texas to the Missouri Pacific and the sales of the St. Louis, Arkansas & Texas and the Joplin Railroads to the St. Louis & San Francisco Co. Since the close of 1882, however, the whole Wabash system has been leased to the St. Louis, Iron Mountain & Southern, which last road is owned by the Missouri Pacific Company, and the Hannibal & St. Joseph road has been sold to the owners of the Chicago, Burlington & Quincy. Miles in operation at the close of the year, numbered 4,501.58. The total gross earnings inside the State, so far as the same can be separately ascertained, amount to $27,616,659. equal to $6,305 per mile of road operated during the year. The total expenses amount to $17,875,000, equal to $4,082 per mile of road. The total net earnings amount to $8,741,659, equal to $2,198 per mile of road, and to thirty-five per cent. of gross earnings. The total amount of stock chargeable to the number of miles in Missouri is $112,500,000, equal to $25,000 per mile of road, and the total amount of bonded debt is $110,250,000, equal to $24,500 per mile of road, making the total stock and bond liabilities $222,750,000, equal to $49,500 per mile of road.

AN expression of enterprise, and at the same time, of remarkable taste—whether good or bad taste the reader will judge—comes to us from Minneapolis, Minnesota, a city distinguished among many other ways, as being the place where *Wood and Iron*, a paper we love to commend, is prepared and published. The last number of said contemporary received at this office, is bright and lively in a new wrapper, headed with a title of whose artistic quality, or otherwise, we would rather not express an opinion. The desire to be non-committal lest we should haply offend, influences us to silence regarding also a singular enormity which begins the first page of the body of the paper. Type in which the articles are printed is clear and good. An ornamental letter at the beginning of every article through nearly half the pages, is dropped when that containing the editorial matter is reached and fails to reappear elsewhere. Why the worthy publishers of *Wood and Iron* should present good reading, good paper and careful printing in such questionable shape is more than we can say. They have succeeded in making a journal as unique among its fellows, for mechanical eccentricities, as admirable in the spirit and nature of its contents.

THE passenger department of the New York, West Shore and Buffalo Railway Company have issued a dainty little book entitled, "Summer in the Catskill Mountains." It is an emanation from the ready pen of Kirk Munroe, is of a size convenient for the pocket, is provided with a good map of large size and numerous very pretty pictures is lavish in substantial information as well as pleasantly descriptive, and is stitched into a stiff cover of a color and other artistic qualities which give it a claim to the appreciation of all persons of correct taste.

DURING May and June, owing to the exhaustion of the appropriation for the publication of Consular Reports, there were no numbers issued. That for July is the more welcome for the interval, and the interest and value of its contents are above the average of preceding issues. Notable among its contents are articles entitled "Patent Law of Brazil," "Manufacture of Camphor in Japan," "Dwelling-House Accommodation in Glasgow"—this from the pen of Bret Harte—"The World's Coffee," "Island of New Guinea," and "American Trade in Madagascar." The pages of this collection of reports are crowded with facts, and although every one of the Consuls whose pen is represented, does not write with the fluency of Bret Harte, all of them present information of a valuable sort and not to be found elsewhere.

New Railroad to Watsontown, Pa.

THE long talked-of branch railroad from Milton to Watsontown has finally been brought to a focus. Reilly and Nolan, who built the new road from Shamokin to West Milton, have received a contract from the Philadelphia and Reading Railroad company to grade and build the new branch through the borough of Milton from the intersection of the Catawissa railroad junction, a little below Milton. This branch is to be built for the accommodation of manufacturers in the town, where there has been no competition heretofore. The contract for grading and building the road from Milton to this place has not yet been awarded, but that the road will be built is a settled fact. We know whereof we speak.

ACCORDING to experiments made on the Hanover, Cologne and Minden Railway, fir sleepers injected with chloride of zinc required a renewal of 21 per cent. in 11 years, birch sleepers injected with creosote a renewal of 46 per cent. at the end of 22 years, and oak sleepers injected with chloride of zinc a renewal of about 21 per cent. at the end of 17 years, while the same kind of sleepers in their natural state required a renewal of at least 49 per cent. at the end of a like period. The conditions in each of these cases were very favorable for obtaining trustworthy proofs.

THE Phosphor-Bronze Smelting Company, Limited, Philadelphia, are furnishing to order all kinds of car and locomotive bearings and miscellaneous castings in Phosphor-Bronze "S" Bearing Metal, at rates which save to buyers the profit of "middlemen." Every reader is acquainted with the superior fitness of phosphor-bronze for the purposes indicated.

THE Pennsylvania Railroad Company is building an inclined plane at Pittsburgh for hoisting cars. The cables are to have an ultimate strength of 173 tons each, the engine will be 700 horse-power, and the cost of the structure will be $275,000.

Financial.

THERE is no disputing the fact that there is a feeling of uncertainty and distrust in the business world. This feeling of uncertainty and distrust, which has for months pervaded the stock market, was intensified during the past week, Boston contributing more than her share of failures in a trade which has been considered one of her chief industries; and this has made business men sensitive, not knowing where the blow will fall next. The Vermont bank failures, coupled with the above, and the reason given for the failures, have led moneyed men to wonder whether any more bank presidents were in the same box.

Saturday's dealings at the Stock Exchange revealed the feelings of the brokers on the general depression. The general list was rendered weak and feverish by the constant circulation of rumors, asserting the failure of commercial firms in this city and of out-of-town banks. There were no failures reported, however, until Monday, when the suspension of Cecil, Ward & Co. was announced at the Exchange, and 1,600 shares of well-distributed stocks were sold for their account. This failure did not affect the stocks or cause any excitement, the house being comparatively small.

The week's fluctuations, ending Saturday night, were in some respects very startling, as can be observed by the increased sales of shares this week over the previous. Sales at the Board, during the week ending August 11th, amounted to 1,917,696 shares against 784,830 for the previous week.

The most marked depression seems to have defined in the Northern Pacific and the Gould properties, Northern Pacific common selling on Monday as low as 39⅝, whereas on August 4th it closed at 48⅝. The Oregon Transcontinental sold as low as 59 on August 13th, whereas on August 4th it closed at 76⅜. Other stocks have suffered considerably, but we mention these two to show the general drift.

Three prominent men have expressed themselves in the *New York Herald* of August 14th, as follows:

Mr. A. S. Hatch, of Fisk & Hatch, and president of the Stock Exchange, said, when asked if there was any danger of a panic, "There is not the slightest danger of a panic. This is only liquidation carried too far. The public is not suffering by this great drop in the price of stocks. The people at large haven't been in Wall street for two years. By-and-by people will wake up to the fact that things are too cheap, and then they will be climbing over each other's shoulders to buy stocks. A country that produces $2,500,000,000 of wealth every year is not going to the dogs very fast, and there is no cause for alarm. Why, our crops of cotton, corn and wheat alone are worth nearly $2,000,000,000, to say nothing of petroleum and other products. There is no more danger of a panic than that I will be struck by lightning as I stand here."

President Edwards, of the Bank of the State of New York, said: "There will be no panic. This decline is a good thing. The public is out of the stock market, and the lower prices go, the more apt people will be to come in and buy. The men who are carrying stocks now are able to hold them."

"In certain conditions of the human system," said Mr. Henry Clews, "it is a good thing to be seasick. You feel dreadfully bad at the time, but you are ever so much better afterward. The stock market is seasick and O, how badly we feel! But we shall be all the better for it presently."

We are inclined to believe that there is no danger of a panic, as for some time back Wall street has been in the hands of the brokers, outside traders giving it a wide berth. It is almost certain that some stocks are selling for less than their real value, and when the public wake to this fact, they will certainly rush in and buy, which will go a long way towards settling the market again.

Money on call rules very easy, which shows an abundance of the needful, and its lack of circulation is simply an evidence of distrust on the part of capitalists. The probabilities are that money lenders are expecting a stringency in the market during the Fall, and are keeping their money well in hand to take advantage of the high rates that generally rule during that period.

Some of the London papers express the opinion that our country will, irrespective of her balance of indebtedness to Europe, require the loan of more gold from that source. While as above stated, money to-day is easy in this city, the rate at the Bank of England is higher than it has been at this season for four years past, viz.: four per cent. At the Bank of France it stands the same as a year ago, and this bank holding nearly forty million francs more gold than it did then, England would find it easy to draw a part of this stock to herself. A drain of gold, however, would be a serious thing to both England and France, and they are closely watching any indications of a demand for it in our country.

Our London contemporaries do not take into account the large amount of gold that our people are holding among themselves. Though the Treasury reserve would be first drawn upon, any real demand would cause the private stock to flow into the financial centers. The absorption of the gold importations of two and three years ago, puzzled many brains; they could not be traced to the treasury or the banks, but should the gold be needed, our people will not be long in showing its whereabouts.

From 1879 to 1882 imports of gold exceeded exports by $155,200,000, the domestic production during that period being estimated at $143,000,000. From January, 1879, to November, 1882, the gold in the Treasury, as shown by Treasury returns, increased $35,700,000; the bank returns show an increase of $56,000,000, which allows for an increase of over $200,000,000 in the amount in circulation. The Director of the Mint estimates it at $187,000,000. In the latter part of 1882, statistics showed $306,000,000 in circulation and $260,000,000 in the banks and the Treasury. This would allow a little over $10 in gold for each of our population, and so little gold being actually used, one would suppose that the country might easily spare some of the accumulation.

But this it cannot do, while the coinage of the standard dollar is maintained; so long as we are turning out an artificial coin we must devise artificial means for retaining the gold which we have. But while we cannot afford to lose gold, we think there is little to create so great a demand as to require us to borrow it from abroad.

THE passenger travel over the Pennsylvania Railroad during July was nearly 20 per cent greater than in July, 1882.

New Inventions.

TO INVENTORS.

THIS department of the JOURNAL is devoted to descriptions of new inventions applicable to railroads. We publish each month a list of the same, and invite each inventor to forward us a description of his invention, believing the publication of facts regarding same will be perused with interest by railroad men, and all interested in the development of our railroad system. *We make no charge for publishing these.*

The descriptions of an invention should be carefully prepared, and written only on one side of the sheet, each sheet properly numbered. Cuts (electrotypes) illustrating the device are always an aid, and attractive to the reader. These should be procured and sent with the "copy." They can be sent by mail. The position of the cut or cuts should be noted in the "copy."

List of Patents for Inventions Relating to Railways, Machinery, Etc.

BEARING DATE JULY 3, 1883.

280,364. BOILER-FEEDER: Josiah S. Du Bois, Camden, N. J. Filed Sept. 25, 1882.

280,381. CAR-COUPLING: George W. Knapp, Corning, N. Y. Filed Dec. 13, 1882.

280,386. CAR-TRUCK: John McLachlan, Chicago, Ill. Filed Dec. 14, 1882.

280,395. LUMBER-DOOR FOR RAILROAD BOX-CARS: George B. Nichols, Galveston, Tex. Filed Dec. 6, 1882.

280,406. RAIL-JOINT: Wm. Seaton, London, England. Filed Dec. 26, 1882. Patented in England Dec. 14, 1881, No. 5,465.

280,414. DRAW-BAR FOR RAILWAY-CARS: Stephen P. Tallman, Dunellen, N. J. Filed March 29, 1883.

280,423. LUBRICATING-CUP: Simon Peter Weller and George Rudolph Roesch, Denver, Col. Filed March 10, 1883.

280,427. BAGGAGE-CHECK: William W. Wilcox, Chicago, Ill. Filed Oct. 4, 1879.

280,430. CAR-DUMPER: Theodore B. Wire, Geneva, Ohio. Filed April 6, 1883.

280,438. ROTARY ENGINE: Charles H. Bacon, Boston, assignor of one-half to Arthur Fuller and Eustis Newhall, Lynn, and John H. Sturgis, Brookline, Mass. Filed Nov. 17, 1882.

280,442. SAFETY CAR-TRUCK: Samuel Brown, San Francisco, Cal. Filed April 10, 1883.

280,449. CAR-COUPLING: William H. Castle, Ashtabula, Ohio. Filed April 21, 1883.

280,470. COVERING FOR STEAM-BOILERS: Edwin A. Hayes, New York, N. Y. Filed Sept. 13, 1882.

280,476. SAFETY RAILWAY-SWITCH: David H. Hoult, Lansdale, Pa. Filed Jan. 13, 1883.

280,502. CAR-COUPLING: Oliver P. Mossgrove, Steubenville, Ohio. Filed Jan. 15, 1883.

280,516. CAR-COUPLING: Abel W. Robinson, Anna, Ill., assignor to himself and Thomas B. Rhodes, same place. Filed April 24, 1883.

280,523. SIGNAL-CAR FOR RAILWAY-TRAINS: John Schofield, South River, N. J. Filed Feb. 12, 1883.

280,528. SNOW-PLOW: Fielding Snedigar, Elkader, Iowa. Filed Oct. 17, 1882.

280,537. CAR-DOOR: John L. Wagner and James Seath, Terre Haute, Ind., assignors to themselves, Thompkins A. Lewis, Indianapolis, Ind., Henry R. Duvall, New York, N. Y., and Robert S. Cox, Terre Haute, Ind. Filed May 21, 1883.

280,559. ELECTRO-MAGNETIC LOCOMOTIVE: Samuel H. Beckwith, Utica, N. Y., assignor to Frank J. Callanen, same place. Filed Jan. 5, 1883.

280,569. LUBRICATOR FOR JOURNALS: Felix Brown, New York, N. Y. Filed April 28, 1883.

280,587. CAR-AXLE LUBRICATOR: Augustus B. Davis and Nathan H. Davis, Philadelphia, Pa., assignors of one-third to Lewis C. Gratz, same place. Filed June 24, 1882.

280,589. INJECTOR: James Dimelow, Wilmington, Del., assignor to the Delaware Steam Appliance Company, same place. Filed Feb. 26, 1883.

280,605. STEAM-GENERATOR: Chas. Gorton, Philadelphia, Pa. Filed April 24, 1883.

280,621. DUMPING-CAR: Levi Hetfield, Plainfield, N. J. Filed May 28, 1883.

280,624. SWITCH AND SIGNAL LANTERN: Lawson G. Huntington, New York, N. Y. Filed May 4, 1883.

280,635. CAR-ROOF: Alfred P. Le Gros, Louisville, Ky. Filed Dec. 9, 1882.

280,640. CAR-BRAKE: Ebenezer W. Lippincott, Grafton, W. Va. Filed May 17, 1883.

280,654. RAILWAY-RAIL JOINT: Richard P. Morgan, Jr., Dwight, Ill. Filed Dec. 6, 1882.

280,668. STEAM ROCK-DRILL: Joseph W. V. Rawlins, Houghton, Mich. Filed March 12, 1883.

280,672. VALVE-GEAR FOR STEAM-ENGINES: Carl Schinke, St. Louis, Mo., assignor to the St. Louis Iron and Machine Works, same place. Filed March 26, 1883.

280,688. GRAIN-CAR DOOR: B. Frank Teal, Philadelphia, Pa. Filed May 11, 1882.

280,702. CAR-WHEEL: Warren J. Willits, Three Rivers, Mich., assignor to the Sheffield Velocipede Car Company, same place. Filed Oct. 17, 1882.

280,703. STEAM-ENGINE: John C. Wilson, Cameron, Tex. Filed Mar. 10, 1883.

280,710. STEAM-ENGINE: William T. Baker, Findlay, Ohio, assignor of two-thirds to Russell Marvin and John Shull, both of same place. Filed March 30, 1883.

280,721. BOILER-FEED: Willard B. Culver, Pittston, Pa. Filed Feb. 2, 1883.

270,722. CAR-VENTILATOR: Prince Joseph Marie Jean Armand Pignatelli d'Aragon, Tours, France. Filed Oct. 6, 1882. Patented in France June 7, 1882, No. 149,376; in England Sept. 1, 1882, No. 4,179, and in Belgium Sept. 12, 1882.

280,733. EJECTOR AND INJECTOR: Louis B. Fulton, Pittsburgh, Pa Filed Oct. 31, 1882.

280,735. DUMPING-CAR: Joseph H. Gartside, Pittsburgh, Pa., assignor of two-thirds to William F. Aull and Edward Martin, same place. Filed Feb. 3, 1883.

280,736. AUTOMATIC LUBRICATOR: William S. Germeyer, Carlisle, Pa., assignor of one-half to Theodore Cornman, same place. Filed May 3, 1883.

280,743. CAR-COUPLING: Hale E. Hawk, Kansas City, Mo. Filed Jan. 15, 1883.

280,744. CAR-STARTER: Lewis W. Hewett, New York, N. Y., and Thomas Millen, Jersey City, N. J., assignors to Philip B. Shaw, Williamsport, Pa. Filed Feb. 21, 1883.

280,760. RAILROAD-RAIL COUPLING: Hiram Parker, Mount Pleasant, Iowa. Filed March 14, 1883.

280,761. GAS-LANTERN FOR RAILWAY-CARS, ETC.: Julius Pintsch, Berlin, Prussia, Germany. Filed Jan. 12, 1883.

280,766. ROTARY ENGINE: Thomas M. Rinehart, Pittsburgh, Pa., assignor to himself, Frederic Winter, and Adam Goodwin, same place. Filed March 31, 1883.

280,775. BELT-PULLEY: Aurin Wood, Worcester, Mass. Filed June 6, 1881. Renewed June 12, 1883.

BEARING DATE JULY 10, 1883.

280,783. CAR-VENTILATION: William Bedell, New York, N. Y. Filed Jan. 20, 1883.

280,802. COMBINED PORTABLE RAILWAY AND WORKING-CAR: Thomas Dark, Buffalo, N. Y. Filed Feb. 13, 1883.

280,835. COMPOUND PUMP: Henry C. Langrehr, San Francisco, Cal. Filed Nov. 3, 1882.

280,856. PAINT COMPOUND OR MIXTURE FOR ROOFS AND OTHER PURPOSES: Arthur G. Peuchen, Toronto, Ontario, Canada. Filed Nov. 7, 1882.

280,903. CINDER-CAR: Jerome L. Boyer, Columbia, Pa. Filed April 9, 1883.

280,904. HOISTING APPARATUS FOR LOCOMOTIVE AND PORTABLE ENGINES: Jerome L. Boyer, Columbia, Pa. Filed May 19, 1883.

280,949. CAR-COUPLING: Peter F. Panabaker, Coon Rapids, Iowa. Filed May 19, 1883.

280,959. SAFETY DEVICE FOR LOCOMOTIVE-PILOTS: Oscar Rothrock, Beech Creek, Pa. Filed March 9, 1883.

280,971. STEAM ROCK-DRILL: Amos Stevens and Arthur L. Stevens, Philadelphia, Pa. Filed Feb. 20, 1882. Renewed June 11, 1883.

280,972. GRAIN-CAR DOOR: Jairus J. Treat, Detroit, Mich. Filed Feb. 20, 1882.

280,974. OSCILLATING PISTON-ENGINE: Orange H. Venner, Malden, assignor of one-half to George W. Venner, Boston, and Alexander M. Wood, Somerville, Mass. Filed March 23, 1883.

280,976. FREIGHT-CAR ROOFING: John C. Wands, St. Louis, Mo. Filed May 12, 1883.

280,978. BEARING FOR CAR-AXLES: Isaac P. Wendell, Philadelphia, Pa. Filed Nov. 23, 1882.

280,984. GOVERNOR FOR STEAM-ENGINES: Napoleon W. Williames, Philadelphia, Pa. Filed April 27, 1883.

280,988. RAILROAD-SWITCH: William A. Wood, Meadville, Mo. Filed Feb. 14, 1883.

280,993. BALANCED SLIDE-VALVE: James B. Allfree, Cumberland, Md. Filed April 27, 1883.

281,004. ROTARY ENGINE: John J. Blair, Tocoma, Wash. Filed Aug. 30, 1882.

281,010. LUBRICATOR: Wm. W. Brisben, Cleveland, Ohio. Filed May 15, 1883.

281,014. FEED-WATER HEATER: Thomas Reed Butman, Cleveland, Ohio. Filed March 9, 1883.

281,015. BALANCED SLIDE-VALVE: Timothy Calver, Portsmouth, Ohio, and Samuel H. Stout, Covington, Ky. Filed April 14, 1883.

281,031. SNOW-PLOW: Eugene C. Dawson, Maquoketa, Iowa. Filed March 3, 1883.

281,037. STEAM-BOILER: Patrick F. Dundon, San Francisco, Cal. Filed April 11, 1883.

281,050. EJECTOR: Louis B. Fulton, Pittsburgh, Pa. Filed July 30, 1881.

281,051. STEAM-BOILER: Richard Garstang, St. Louis, Mo. Filed Feb. 27, 1883.

281,055. NUT-LOCK: John B. Greenhalgh and Henry Greenhalgh, Blackstone, Mass. Filed Dec. 30, 1882.

281,058. BELT-FASTENER: Hubert C. Hart, Unionville, Conn. Filed May 18, 1883.

281,067. STOCK-CAR: Henry C. Hicks, Minneapolis, Minn. Filed Mar. 17, 1883.

281,081. STRAIGHT-WAY VALVE: Bartholomew J. Kelly, Troy, N. Y. Filed March 30, 1883.

281,085. CAR-BRAKE: Charles Lederer and Frank X. Marks, Norfolk, Neb. Filed April 28, 1883.

281,094. CAR-COUPLING: Gottlieb Maulick, Beaver Falls, Pa. Filed April 10, 1883.

281,122. VALVE-GEAR: Ferris Ogden, Mount Vernon, Ohio. Filed Jan. 31, 1883.

281,123. VALVE-GEAR: Jno. D. Olds, Fort Wayne, Ind. Filed Nov. 27, 1882.

281,129. CAR-SEAT: William H. Paulding, Peekskill, and Bernard J. Maybeck, New York, N. Y. Filed March 26, 1883.

281,138. MACHINE FOR FINISHING GLOBE-VALVE BODIES: Francis H. Richards, Springfield, Mass., assignor to the Joel Hayden Brass Company, Lorain, Ohio. Filed Oct. 26, 1882.

281,153. LANTERN: Frank E. Smothers, Gloucester, Mass. Filed May 14, 1883.

281,155. CAR-COUPLING: Thomas Sparks, Kentontown, Ky. Filed April 28, 1883.

281,157. SELF-ADJUSTING BEARING FOR CAR-AXLES: Oscar S. Stearns, New York, N. Y., assignor, by direct and mesne assignments, to the Stearns Railway Improvement Company, of New York. Filed Dec. 2, 1881. Renewed June 5, 1883.

281,160. SPARK-EJECTOR FOR LOCOMOTIVES: James K. Taylor, Boston, Mass., assignor to J. K. Taylor Company, Concord, N. H. Filed March 22, 1883.

281,163. BAGGAGE-CHECK: John Alexander Thompson, Monticello, N. Y. Filed Feb. 14, 1883.

281,170. CAR-DOOR: Arnold W. Zimmerman, Chicago, Ill. Filed April 9, 1883.

281,173. CAR-AXLE-BOX LID: Warren J. Ball, Canton, Ohio. Filed Oct. 16, 1882.

281,174. CAR-DOOR FASTENING: Richard H. Briggs and James H. Dougherty, Whistler, Ala. Filed April 10, 1883.

281,189. OIL-CAN: John W. Jackson, Sharpsville, Pa. Filed May 17, 1883.

281,192. SLEEPING-CAR PUMP-JOINT: John Kirby, Jr., Ludlow, Ky., assignor to Post & Co., Cincinnati, Ohio. Filed Feb. 13, 1883.

281,214. GRAIN-ELEVATOR: William Watson, Memphis, Tenn. Filed March 26, 1883.

281,215. STATION-INDICATOR: John W. Watts, Clarksville, Mo. Filed March 22, 1883.

281,222. BRAKE-LOCK: Cyrus C. Clay, Dunnings, Pa. Filed Nov. 1, 1882.

BEARING DATE JULY 17, 1883.

281,241. LUBRICATOR: Warren H. Craig, Lawrence, Mass. Filed June 13, 1883.

281,246. CAR-DOOR FASTENER: Samuel L. Denney, Strasburg, assignor of one-fourth to Israel L. Landis, Lancaster, Pa. Filed May 24, 1883.

281,248. PROCESS OF PREPARING SLAG FOR RAILWAYS AND ROADWAYS: Charles Diebold, Lebanon, Pa. Filed Dec. 11, 1882.

281,251. CAR-COUPLING: Casper C. Eber, St. Paul, Minn. Filed April 12, 1883.

281,271. CAR-COUPLING: Isaac N. Hoyt, Augusta, Wis. Filed March 20, 1883.

281,312. CUT-OFF-VALVE GEAR: John K. Hallock and Elijah F. Spaulding, Erie, Pa., assignors of one-third to Elmer S. Smith, same place. Filed May 11, 1883.

281,327. LOCOMOTIVE HEAD-LIGHT WITH SIGNAL ATTACHMENT: Irvin A. Williams and Charles I. Williams, Utica, N. Y. Filed March 24, 1882.

281,343. HANGER FOR SHAFTING: Philip Cramer, Montreal, Quebec, Canada. Filed Sept. 28, 1882. Patented in Canada Dec. 4, 1881, No. 13,794.

281,380. BOILER-FEEDER: Richard Lanckner, Bay City, assignor of one-half to Sophia Jocken, East Saginaw, Mich. Filed Jan. 31, 1883.

281,383. STATION-INDICATOR: Jos. A. McDERMOTT, Lynn, Mass., assignor of three-eighths to John H. Caswell, same place. Filed Dec. 14, 1882.

281,385. INJECTOR: Wm. T. Messinger, Cambridge, Mass. Filed Nov. 6, 1882.

281,389. INJECTOR: Horace B. Murdock, Detroit, Mich. Filed April 3, 1883.

281,394. GLOBE OR SIMILAR VALVE: James L. Phillips, Worcester, Mass. Filed Oct. 31, 1882.

281,409. SLEEPING-CAR: John A. Sleicher, Troy, N. Y. Filed Feb. 19, 1883.

281,421. REFRIGERATING-CAR: Geo. R. Wight, New York, N. Y. Filed Dec. 5, 1881.

281,422. METHOD OF CASTING CAR-WHEELS: Wm. Wilmington, Toledo, Ohio. Filed June 13, 1883.

281,445. CAR-BRAKE: Edmund R. Bristol, Madison, Wis. Filed May 26, 1883.

281,479. CAR-COUPLING: Charles W. Ferguson, Janesville, Wis. Filed May 8, 1883.

281,486. RAILWAY-SWITCH: John Gebby, Jr., Bellefontaine, Ohio. Filed Jan. 31, 1883.

281,495. DEPOSITING TORPEDOES IN SNOW-BANKS: George A. Gunther, New Utrecht, N. Y. Filed Jan. 17, 1883.

281,496. SNOW-PLOW: George A. Gunther, New Utrecht, N. Y. Filed Jan. 27, 1883.

281,497. SNOW-PLOW: George A. Gunther, New Utrecht, assignor of one-third to Hermann Keirstein, Brooklyn, N. Y. Filed Feb. 24, 1883.

281,516. RAILWAY TIME-INDICATOR: J. Miller Kelly, Rochester, N. Y. Filed Jan. 26, 1883.

281,535. CAR-COUPLING: Alfred C. Long, Flora Dale, Pa. Filed April 3, 1883.

281,538. CAR-AXLE LUBRICATOR: Michael MacMahon, Brooklyn, N. Y., assignor of five-eighths to Samuel Van Ness and Daniel Sullivan, both of same place. Filed Oct. 18, 1882.

281,579. ELECTRIC VALVE-GEAR FOR STEAM-ENGINES: Geo. W. Storer, Philadelphia, Pa. Filed Oct. 23, 1882.

281,581. SMOKE AND SPARK CONVEYOR: Ohannes S. Tavshanjian, Constantinople, Turkey. Filed April 6, 1883.

281,631. REFRIGERATOR-CAR: Charles P. Jackson, Chicago, Ill. Filed April 13, 1883.

BEARING DATE JULY 24, 1883.

281,665. VALVE FOR STEAM-ENGINES: George H. Burley, Tyrone, Pa. Filed May 1, 1883.

281,672. ELECTRIC RAILWAY: Francis B. Crocker, Charles G. Curtis, and Schuyler S. Wheeler, New York, N. Y. Filed April 6, 1882.

281,684. STATION-INDICATOR: Asher B. Gill, Philadelphia, Pa. Filed April 13, 1883.

281,699. LUBRICATOR: John Kelly, Peoria, Ill. Filed Jan. 13, 1883.

281,700. FRICTION-CLUTCH: D. Randolph Kinyon, Raritan, N. J., assignor of one-half to Job C. Kinyon, same place. Filed May 11, 1883.

281,702. BOILER-FEEDER: William H. H. Knowlton, Chicago, Ill., and Philip Sage, Dubuque, Iowa. Filed April 19, 1883.

281,718. HAND ROCK-DRILLING MACHINE: Henry F. Parsons, San Francisco, Cal., and Hugo Borchardt, Bridgeport, Conn., assignors to Daniel Cook, San Francisco, Cal. Filed Sept. 12, 1881.

281,730. RAILWAY-CAR ELECTRICAL CIRCUIT-COUPLER: Palmer C. Ricketts, Troy, N. Y. Filed Oct. 7, 1880.

281,733. BAGGAGE-CHECK: Charles Sears, South Evanston, Ill. Filed Oct. 20, 1882.

281,766. SPARK-ARRESTER: Richard M. Howling, Ballarat, Victoria. Filed Feb. 3, 1883. Patented in Victoria, Oct. 4, 1882, No. 3,316, and in New South Wales Dec. 5, 1882.

281,774. STEAM-BLOWER: William McClave, Scranton, Pa. Filed May 1, 1883.

281,775. HEATER AND PURIFIER FOR FEED-WATER: Walter S. McKinney, Binghamton, N. Y. Filed May 18, 1883.

281,779. CAR-COUPLING: Frank Miller, Olema, assignor of one-fourth to Upton M. Gordon and David Nye, San Rafael, Cal. Filed May 26, 1883.

281,796. ROTARY ENGINE: Orton H. Robinson, Manistee, Mich. Filed Dec. 20, 1882.

281,797. LANTERN: Allen J. Sawyer, Clark Woodbury, and Erastus Lane, Oldtown, Me. Filed May 28, 1883.

281,801. HEATING APPARATUS FOR CARS: Isidor Shirpser, San

Francisco, Cal., assignor to Paul Steck, same place. Filed March 13, 1883.

281,803. APPARATUS TO PREVENT BOILER EXPLOSIONS: Lebbeus Simkins, Marshfield, Oreg. Filed April 24, 1883.

281,806. RAILWAY-TIE: Addison R. Spaulding, Lake City, Minn. Filed March 24, 1883.

281,809. STEAM-ENGINE: Jesse Walrath, Racine, Wis. Filed April 23, 1883.

281,812. CUT-OFF VALVE: Napoleon W. Williames, Philadelphia, Pa. Filed April 27, 1883.

281,828. PULLEY: William F. Boysen, Buffalo, N. Y. Filed Jan. 10, 1883.

281,835. TICKET-PUNCH: William H. Campbell, New York, N. Y. Filed May 22, 1883.

281,836. STEAM-ACTUATED VALVE: George Clarke, Cincinnati, Ohio, assignor, by direct and mesne assignments, to the Clarke Automatic Steam Valve Company, same place. Filed Dec. 26, 1882.

281,839. RAILWAY PNEUMATIC SWITCH AND ELECTRIC INDICATOR: Charles A. Cooper, Pittsburgh, Pa. Filed June 19, 1882.

281,843. STEAM-ENGINE: Franklin D. Cummer, Detroit, Mich., assignor to the Cummer Engine Company, Cleveland, Ohio. Filed Sept 7, 1881.

281,844. EXCAVATOR AND WRECKER COMBINED: Nathan J. Cuyle, Oswego, N. Y. Filed April 5, 1883.

281,850. UNIVERSAL JOINT: Robt. Edmonds, Norfolk, Va. Filed April 3, 1883.

281,852. STEAM BOILER AND FURNACE: Adam Cyrus Engert, Three Mills Lane, County of Middlesex, England. Filed March 27, 1883.

281,863. CAR-SEAL: Freeman C. Gillmore, Chicago, Ill. Filed March 27, 1883.

281,869. LOCOMOTIVE HEAD-LIGHT: Alex. H. Handlan, Jr., St. Louis, Mo. Filed March 21, 1883.

281,890. VERTICAL STEAM-BOILER: Joseph A. Langdon, Pittsburgh, Pa. Filed March 26, 1883.

281,901. CAR-COUPLING: Wm. McConway, Pittsburgh, Pa. Filed April 4, 1883.

281,907. BALANCE-VALVE: James B. Miller, Kent, Ohio. Filed April 6, 1883.

281,935. CAR-COUPLING: Frederick Sloat, Chicago, Ill., assignor of one-half to Martha W. Perkins, same place. Filed April 4, 1883.

281,936. ASH-PAN FOR LOCOMOTIVES: Charles F. Smith, West Bay City, Mich. Filed April 12, 1883.

281,954. SNOW-PLOW: William H. H. Baker, Freeport, Ill. Filed Mar. 29, 1883.

281,974. CAR-COUPLING: Nathaniel J. Cheeney, East Greenwich, R. I. Filed Nov. 2, 1882.

281,975. CAR-STARTER: Wm. B. Cleaveland, Bridgeport, Conn. Filed March 15, 1883.

281,983. CAR-COUPLING: Robert H. Dowling, Newark, Ohio, assignor of one-half to Charles H. Follett, same place. Filed Jan. 4, 1883.

282,009. CAR-COUPLING: John O'Connor, Toronto, Ontario, Canada. Filed April 27, 1883.

BEARING DATE JULY 31, 1883.

282,042. PUMP-REGULATOR: James H. Blessing, Albany, N. Y. Filed April 7, 1883.

282,058. VALVE-SEAT FOR STEAM-ENGINES: Isaac H. Congdon, Omaha, Neb. Filed Jan. 15, 1883.

282,070. PUMPING MECHANISM FOR SUPPLYING RAILWAY-TANKS: Robert P. Garsed, Norristown, Pa. Filed March 24, 1882.

282,071. STEAM MOTOR-ENGINE: Harvey F. Gaskill, Lockport, N. Y. Filed Jan. 2, 1883.

282,103. BLAST-CONCENTRATOR FOR LOCOMOTIVES: Henry Millholland, Philadelphia, Pa., assignor of one-half to Robert W. Lesley, same place. Filed May 28, 1883.

282,104. DEFLECTING-PLATE FOR LOCOMOTIVES: Henry Millholland, Philadelphia, Pa., assignor of one-half to Robert W. Lesley, same place. Filed May 28, 1883.

282,114. NUT-LOCK: John Parr, Humboldt, Neb. Filed Dec. 6, 1882.

282,120. SAFETY-SEAM FOR STEAM-BOILERS: James R. Robinson, Cambridge, Mass. Filed Nov. 3, 1882.

282,125. CAR-UNLOADING APPARATUS: Vine D. Simar and John Dale, St. Paul, Minn. Filed Dec. 19, 1882.

282,127. LUBRICATOR: Frank S. Somes and Samuel H. Kimball, Boston, Mass., assignors, by mesne assignments, to said Kimball. Filed May 22, 1883.

282,149. CAR-AXLE BOX: Wm. S. G. Baker, Baltimore, Md. Filed May 9, 1883.

282,158. APPARATUS FOR LIGHTING CARS BY ELECTRICITY: George D. Burton, New Ipswich, N. H. Filed Dec. 19, 1882.

282,172. STEAM-GENERATOR: Alfred H. Crockford, Newark, N. J. Filed Feb. 19, 1883.

282,196. REFRIGERATOR-CAR: Charles P. Jackson, Chicago, Ill. Filed May 9, 1883.

282,200. ELEVATED WIRE RAILWAY: Smith H. Knapp and Alpheus E. Adams, Danbury, Conn. Filed Feb. 5, 1883.

282,205. METHOD OF ATTACHING SEALS TO CARS: Thomas H. Malone, Milwaukee, and Geo. A. Whiting, Neenah, Wis. Filed Aug. 10, 1882.

282,222. CAR-BRAKE: John H. Pitard, Mobile, Ala. Filed June 5, 1883.

282,229. RAILWAY ELECTRIC SIGNAL APPARATUS: Charles H. Scott, Boston, Mass. Filed June 18, 1883.

282,249. TRACK-CIRCUIT CONNECTOR: George Westinghouse, Jr., Pittsburgh, Pa. Filed May 23, 1883.

282,259. RAILWAY-RAIL JOINT: Joseph H. Bloomfield, Rio, and Martin W. Boone, Galesburg, Ill.; said Boone assignor to said Bloomfield. Filed Jan. 12, 1883.

282,281. RAILROAD SNOW-PLOW: John Q. Day, Red Cliff, Colo. Filed Aug. 8, 1882.

282,291. LANTERN: James Fanning, Salem, Mass. Filed May 5, 1883.

282,309. RAILROAD CHAIR AND TIE: Levi Haas, Chester, Pa. Filed Aug. 28, 1882.

282,324. RAILWAY-CAR: Wales Hubbard, Wiscasset, Me., assignor of one-fourth to James H. May, Washington, D. C. Filed April 25, 1883.

282,330. STEAM-BOILER: George Kingsley, Leavenworth, Kansas. Filed April 10, 1883.

282,382. ROCK-DRILLING MACHINE: Alfred Shedlock, Brooklyn, N. Y., assignor to John D. Shedlock, same place. Filed Nov. 27, 1882.

282,383. NUT-LOCK: James H. Sheehan, Bangor, Me., assignor of one-half to Ezra L. Sterns, same place. Filed May 19, 1883.

282,388. CUT-OFF-VALVE GEAR: Le Grand Skinner, Erie, Pa. Filed May 29, 1883.

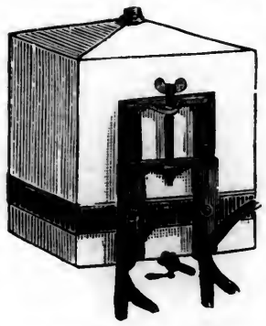
282,397. CAR-COUPLING: Andrew A. Stetson, Florida, Mo. Filed May 17, 1883.

282,404. VENTILATOR FOR LOCOMOTIVE CINDER-CHAMBERS: Jas. K. Taylor, Boston, Mass., assignor to J. K. Taylor Company, Concord, N. H. Filed April 28, 1883.

282,438. CAR-COUPLING: Washington I. Byard, Little Falls, N. Y., assignor to himself, M. Willett Briggs, and George A. Oppel, same place. Filed May 10, 1883.

Journal Box Attachment.

WE give herewith an illustration of the journal box attachment invented and patented by Enos Curtiss, of Findlay, Ohio. The object of the invention is to obviate the annoyance of a heated journal box, causing delay and frequently loss. Mr. Curtiss's attachment can be made to a heated journal box easily and quickly, and the solution of the can or box allowed to run into the journal box and form a metallic coating around the journal, stopping its cutting, cooling it off and lubricating while running from station to station. One can or box is all that is needed to a train of cars.



Murphy's Patent Locomotive.

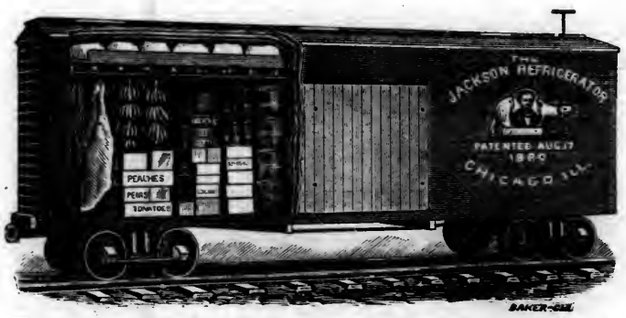
G. B. JOHNSON & CO., of Granville, Ohio, are owners of Murphy's Patent Locomotive, an invention which presents such originality, and suggests such possibilities, as give it pre-eminence among the numerous improvements thought out in this busy-brained age of the world. We understand that the above firm are anxious to have an engine built on the Murphy plan and tested, and will lay the matter before some locomotive builders very soon. They are encouraged in this intention by the opinion of every railroad man who has seen drawings of the proposed locomotive, that it is a great improvement. They believe that a perfectly built specimen of said engine, is capable of drawing fifteen sleepers sixty miles an hour, and thus to earn the large amount of money said to have been offered

by Mr. Vanderbilt, for a locomotive capable of performing this remarkable feat of combined strength and speed. Its owners hold the opinion that their patent engine will make better time, and take a heavier train, than any locomotive of the same height now in use.

Its alleged advantages are in the increase of heating surface, increased weight on the driving-wheels, and the direct application of power to each driving-wheel. Moreover, the change of the location of the steam-chest, with a direct driving-bar to each wheel, and the piston-rod resting on the cross-heads, is believed to be a great relief to the wear of the cylinder. Another alleged advantage of the application of power to the driving-wheels, is in lessening the probability of accident by the breaking of the driving-bars. On the present plan, many men are killed and other great damage done, not to speak of frequent delays of trains, by the breaking of driving-bars. An effective provision against this accident would be of incalculable use; and this, it is claimed, is more or less approximately found in the structure projected in the Murphy patent. Other alleged improvements of less importance need not be mentioned at this time.

We are among the people who look forward to the creation and testing of the Murphy Patent Locomotive, with the interest due especially to the practical introduction of all improvements on a comprehensive scale.

The Jackson Refrigerator Car.



THE interest of dealers in meats and perishable goods is receiving fresh impetus in the increased traffic in dressed meats, shipped in refrigerator cars, and in the increased facilities for holding over such products. The inventive genius of the time is stirring up the refrigerator car question, and some form of construction will be adopted as meeting the great want. One of the newest refrigerator cars is that of Chas. P. Jackson, superintendent of the Jackson Refrigerator Company, of Chicago.

An experience of years in the construction of cold storage houses entitles his claims to a careful consideration. His plan of construction is simple and practical. Broken ice and salt may be used, or full-sized cakes of ice. The ice being entirely overhead gives as a result an even circulation of cold air all through the car, and with a cold and perfectly dry atmosphere. All is so arranged that the temperature may be regulated at will, a new feature in refrigerator cars. The Jackson Refrigerator Car has the endorsement of practical men, as being the "coming car."

NINE cargoes of coal-dirt were recently shipped from collieries in the vicinity of Pottsville to Boston, to be mixed with bituminous coal.

The Rothrock Locomotive.

OSCAR ROTHROCK, of Beech Creek, Clinton county, Penn., has achieved enviable notoriety as an inventor. He is quite a young man, but is already the father of certain inventions which are remarkable, among other reasons, for the importance of the object aimed at in them. For example that one under review relates to the class of locomotives which carry their own supply of water and fuel; and it has for its object to provide a novel construction of boiler, water tanks, and fuel receiver, whereby the water and fuel carrying capacity of the locomotive is greatly increased over ordinary locomotives of a corresponding length and width, and the products of combustion from the fire box utilized for generating steam more rapidly than in ordinary boilers, and with a less amount of fuel than heretofore.

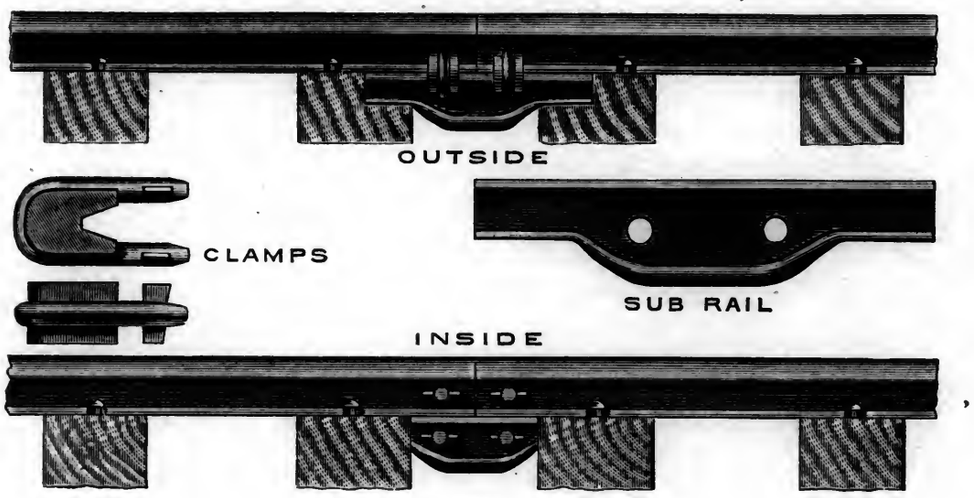
To these ends the invention consists in a twin boiler, which is composed of two parallel sections or shells having smoke flues, and communicating at their front ends with a fire chamber or box. A space or passage way is left between the two boiler sections for the reception of the engineer and the storage of fuel, and at the sides of this passage way are located water tanks, which may also form the floor of the passage way, and extend across the latter above the line of the boiler, in rear of the engine room, so as to form a roof and tanks of a large capacity. Smoke stacks are located at the rear ends of the boiler sections; or a single centrally-located stack may receive the products of combustion from both boilers. A cab or housing extends above the passage way, between the boiler sections, for the protection of the engineer and fuel. The door of the fire box is arranged at the front end of the passage way, and the valves, gauges, reversing and brake levers, and other engine accessories are also located at this point. A steam dome surmounting the fire box receives the steam from both boiler sections, and is connected with the valve chests of the working cylinders; or a steam dome may be arranged above each boiler section at points in rear of the fire box.

Mr. Rothrock's invention is applicable to railroad locomotives of every description, traction, dummy, and agricultural engines, steam-propelled cars and carriages, and portable engines of all classes.

The inventor claims as advantages of the system described: 1. That an engine having two small boilers with water tank and fuel receiver in one structure will do more work than an engine having one large boiler, even if the two boilers together are one-third smaller than the single boiler; therefore smaller boiler capacity will have the motive power of the larger boiler. 2. A twin-boiler locomotive can run in either direction and need never be turned, thus preventing the serious casualties arising from running ordinary engines backwards. 3. Weight and consequently time are saved. 4. The twin locomotive having a tank going down to within four inches of the rails or ground, as is proposed in certain cases, will not leave the track as readily as a single boiler locomotive. 5. A twin locomotive built under the inventor's housing, covering it from side to side and from end to end, and down to within three inches of the cross-ties in the track, will wear three times as long as one built with all its valuable parts exposed to the action of the weather. 6. In the new locomotive the arrangement of the steam and water domes, fire box or

boxes, etc., is such that the actual expense of running need not exceed one-half of the present cost. 7. The new engine can be built of almost any length and capacity, or may be constructed with boilers four or five feet long, as proposed for small self-propelling steam fire-engines. 8. The twin boiler system can be applied to any use or service as a motive force, being well adapted to tramways, plateways, small wagon-road engines, etc., as well as the largest railway locomotive; to this end it is intended to build the boilers with the tanks almost on a line with the axles in some instances, and to place them partially over the wheels in others, and to extend the water tank down almost to the ground, or place it partly above or partly below the boiler, as circumstances may require, cutting away the water tank, so to speak, to place advantageously the controlling gear, axles, etc. 9. The small truck at one or both ends of the Rothrock locomotive, as shown in the specification published by the Patent Office, can be dispensed with as circumstances may require.

Certainly Mr. Rothrock has provided an abundance of material prompting to further inquiry. If his locomotive is capable of doing what is claimed for it, its invention cannot fail to become an epoch in the progress of railway development.



THE MORGAN RAIL JOINT.

The Morgan Rail Joint.

THIS invention consists in placing underneath the joint of the rails of a railway track, what by way of designation may be called a sub-rail, and securing the same to the track-rails by clamps and keys, so that the track-rails and the sub-rail will be clamped firmly together, and both supported by the cross-ties.

The accompanying electrotype shows a longitudinal view of the outside of the track-rails and sub-rail; also in that view is exhibited the supporting cross-ties and the rabbets in the ends of the joint ties. Where the base of the sub-rail rests, the rabbets have a vertical depth of about two and one-fourth inches, and a horizontal depth of about four inches, extending from the inside of the track-rails outward to the ends of the ties. The inside view shows the track-rails, sub-rail and the ends of the staples of the clamps, and also sections of the ties inside of the rabbets; a top and longitudinal view is given, presenting the cast-iron jaw, staple and keys which constitute the clamp. The sub-rail extends from the middle of one cross-tie to the middle of the next one, and is of such depth that when it rests on the bottom of the rabbet, the track-rails will rest fairly upon the top of the sub-rail, and also on the top surface of the same cross-tie beyond the rabbet. It will be readily seen that the wear on the top surface of the joint tie, and on the bottom of the rabbet must be the same. There is no appreciable wear of the sub-rail; it will therefore last a long time and always be competent to the service. The track cannot "run" unless it runs the road-bed with it. The track-rails being clamped to the sub-rail, which is stationary, the action of the track-rails by expansion and contraction, causes a tightening of the clamps, the cast jaws of which have eccentric inner surfaces, a "bite" at the limit of either the expansion or contraction of the track-rails; thus rigid contact of the track-rails with the sub-rail is constantly maintained by the clamps, so that the ends of the track-rails are at all times on *the same plane*, and either track-rail cannot be depressed below the other by approaching locomotives or cars; but whatever depression may take place, it is necessarily *the same in each rail* and is common to the track generally, thus preserving the surface substantially as smooth and true at the joint as at any other part of the track.

These joint supports and fastenings can be cheaply made by the railway companies themselves, out of the scrap iron and worn rails which they now sell for less than one cent per pound. The sub-rails are made by swaging down at the ends the head of the pieces of scrap track-rail, cut to suitable length, about eighteen inches. The economy, however, which is claimed for this joint is not wholly in the use of scrap and old material, and in the effect of smooth, enduring joints upon the rails themselves and the rolling stock, but this method enables the restoration of the best form of track-rail, which went out of use solely to make the fish-plate joints at all practicable. The evidence of the value of this joint is not only manifest in its simple mechanical construction and its direct support, but actual use under severe conditions since Oct. 23, 1883, has, to a measurable degree, demonstrated the economy, competency and perfection claimed for it.

All parties interested in the above invention can learn further particulars by addressing Richard P. Morgan, Jr., at Dwight, Ill.

O. P. Mossgrove's Car Coupling.

THE patentee of this device lives at Steubenville, Ohio. By his plan the drawheads are divided vertically at their outer ends, to join the members, which members are recessed at their upper edges to form hooks. Between the members of the drawheads are pivoted the tumblers, upon pins; and outside of these members, upon ends of said pins, are pivoted the connecting clevises. The tumblers normally project in front of the outer ends of the drawheads. In order to couple the cars, one or other of the connecting clevises is to be turned upward against the arm of the tumbler; the other is to be turned down below the drawhead. The clevises being in this condition, the cars are simply to be backed together, which will bring the heels of the tumblers together, and give the arms of said tumblers a sudden movement toward each other. This movement will throw the connecting clevis forward over the hooks of the opposing car, and thus automatically make the connection. In case the cars to be connected vary much in height, the connecting clevis of the higher one should be set up for coupling. To uncouple the cars, the clevis which makes the connection is simply to be raised out or off from the hooks formed by the members being recessed at their upper edges, which may be done by rod or chain or other connections extending to the top and sides of cars; and these connections may be so arranged that the clevises may be held up above the drawheads of the opposing car, so that the cars may be uncoupled while in motion if desired. The couplings constructed in this manner are said to be very cheap, durable, and certain, and are applicable to cars of any height.

New Patent Car Roof.

WE have received some particulars of the car roof lately patented by Alfred P. Le Gros, of Louisville, Kentucky. The object of Mr. Le Gros' invention is to improve the car roof of a railroad box or freight car in the following two particulars: first, to have the wooden roof covered with canvas, which is always well saturated with paint; secondly, to have the running-board fixed or attached to the ridge of the roof in such a manner that it can be removed without injuring the roof. The original object is that the roof of the car be guarded from breaks, holes or leaks of any kind.

Laying down the side beams and gable-rafters, as usual, the inventor lays upon them planks of convenient thickness running down from ridge or middle on each side beyond the side beams, as is now customary. These boards are nailed down the side beams and rafters as usual. Such boards are say six inches wide on their lower surface—with a half-rabbet cut out at each edge from their upper faces, where they meet the adjoining boards—except the two extreme boards, which have the rabbet cut in only one edge—the two half-rabbets together leaving room for a dovetailed stick. The lower edges of the rabbet are slightly inclined downward to where the two boards meet. On either side of the rabbet is a groove, and a similar groove is put in each side of the dovetailed stick. The dovetailed sticks should protrude slightly—say one-fourth inch—above the upper surface of the boards; but this is not essential. On the upper surface of the boards, and along the inner surface of the rabbets, a thick coat of ordinary paint is laid.

Over this coat of paint, and fitting into the rabbets, canvas is drawn, and this canvas is held down by the dovetailed sticks. The canvas is painted also on its upper side. The object of the paint on the inner side of the canvas is mainly to protect the wood from warping and the nails from rusting.

In order to construct the roof according to this method, the first board, beginning at one end of the frame, ought first to be nailed down next its upper surface, and the surface of the rabbet should be painted heavily. Then draw the canvas over it, and afterward paint the lower side of the canvas where it fits into the half-rabbet, as well as its upper side; then draw it into the half-rabbet. Next, the dovetailed stick is laid down, and a coat of paint put on its upper side or on the inside of the canvas joining it. Then put paint on the other side of the canvas. The next board is then laid down; but at least the inside of the half-rabbet which joins that of the first board has to be painted before the board is nailed in its place. The builder will proceed in the same order to lay down each board, put on paint, draw the canvas farther, lay down the next dovetailed stick and the next board, nailing down each board when it is put in its place till he comes to the last board, which has a half-rabbet on only one edge or side.

The object and effect of the inclined bases of the rabbet is to keep a reservoir of moist paint between them and the flat base of the dovetailed stick, and the same object and effect will be also subserved by the grooves in the sides of the rabbet and stick.

Mr. Le Gros claims for his patent: 1. Freedom from leakage; 2. Ease, rapidity and cheapness of repairs; 3. Cheapness of construction; 4. No use of corrosive substance; 5. The canvas will neither expand nor contract; 6. No kind of weather will affect it.

This roof can be constructed for twenty dollars, or but a little over that. No nail or piece of iron or metal of any kind will be exposed to the action of the atmosphere. The roof is first laid with one and three-quarter or two inch planks, tongued and grooved, but with a groove on either side so as to receive a quantity of thick paint, protected and kept there by the heavy cotton cloth (or canvas as the case may be), which passes under and around the tongue; the paint thus keeping the cloth moist and pliant, will inevitably prevent leakage. All parts of the roof are protected by paint and canvas. The paint is protected by the groove and rabbet. The canvas will yield so that it will not be torn by the rolling or jarring of the car. The plank may split underneath, but being covered by a painted canvas (top and bottom) no leak will be caused thereby. Should a part of the plank or canvas be torn off from any cause, a part of the roof can be replaced at once. No especial skill is required in its construction. One man and two active stout lads can construct three in one day.

The roof may be constructed of pine or poplar lumber, and the canvas or cotton cloth used may be inferior if the paint be well applied. One good coat of paint per annum will be sufficient.

Rothrock's Safety Device for Locomotive Pilots.

THE device patented by Oscar Rothrock, of Beech Creek, Clinton county, Penn., on the tenth of July last, relates to,

a safety attachment or guard device for locomotive-pilots or cow-catchers, the object thereof being to remove obstructions, dead or alive, from the track and prevent the train from passing over them. The pilot or cow-catcher of a locomotive as ordinarily constructed, does not extend to the track rails, and hence it frequently happens that an animal or other object, after having been struck by the pilot, drops again in front of it, or is otherwise brought into such a position that the locomotive and train pass over the obstruction, consequently rendering the train very liable to be thrown off the track.

Mr. Rothrock's invention is designed to obviate such accidents; and it consists of a sheath or hood which conforms to the shape or contour of the pilot, and is made to slide up and down on its outer or inner surface. The bottom edge of the sheath is provided with two notches, which receive the track rails and permit the central portion of the shield to sweep the space between them. The sheath slides up and down on roller ways on the pilot bars, and is combined with suitable mechanism for operating it from the cab or engine room of the locomotive. The sheath, when lowered to its full extent, projects beyond the track rails and moves in close proximity to the cross ties or sleepers, so as to effectually prevent any obstruction from passing under the pilot. The sheath generally carries the brushes for sweeping the track rails, and may also carry the scoop and hose connected therewith for taking up water when the train is running. It is proposed to place the brooms or brushes under the shield or to lay them down into it, when the shield is used upon a freight train. The inventor provides a forked connecting rod, one branch going down on each side of the draw-head; or he uses two connecting rods or shafts from main rod. He also proposes to leave notches of ample size to receive the bumper blocks or buffer blocks, when an engine is supplied with the same. On new style or twin locomotives (described elsewhere in this issue), it is intended to make the shield of such proportions that it will protect the front of the engine housing, or in other words prevent any object from being thrown against the glass. In some cases this upper extension will be of lattice work, or otherwise arranged so as not to obstruct the view. On these engines the inventor will also use a wheel and knuckle, or ball-jointed controlling gear, and other improvements which will be specified at the proper time.

Successful Second Trial Trip of the Burton Stock Car.

THE subject of stock transportation is one that has already attracted wide attention, and especially so since the marvelous success of the first trial trip of the Burton Stock Car. That event aroused great interest on the part of the American Humane Association, and Mr. Henry Horn, as special agent of the society, was sent with the second train of Burton cars that came to Boston from Chicago. There were three cars of the Burton patent, containing in all forty-eight cattle, one car-load of which were not up to the average of shipping cattle. At Binghamton, N. Y., several of the ordinary cars used for the transportation of cattle were taken on, giving an excellent opportunity to compare the merits of the old and new systems. The trip from Chicago was made with a number of delays, and occupied 105 hours, about 50 hours more than is intended should be used by the Burton car when it is run in regular trains, its construction being such that trains may be run on passenger-train time. Mr. Horn pronounced himself as very highly pleased with the Burton car, and says that it equals any of the several improved stock cars which he has previously tested. The shrinkage was twenty pounds to a head on cattle in the Burton cars, while sixty pounds is the minimum of past records; and in no essential for the comfort of the animals and their transportation and arrival in sound condition, was the Burton car lacking. In fact, so far as Mr. Horn could judge, it filled every requirement, beyond any previous tests of other cars. The result may well be a source of gratification to the company, and is worthy of public attention, as giving assurance that the day will soon be at hand when cattle may be transported from Chicago to Boston, and arrive here in as good condition as when first placed upon the cars.

Varnish for Foundry Patterns and Machinery.

A VARNISH has been patented in Germany for the above purpose, which, it is claimed, (we do not know how justly), dries as soon as put on, gives the patterns a smooth surface, thus insuring an easy slip out of the mould, and which prevents the pattern from warping, shrinking or swelling, and is quite impervious to moisture. This varnish is prepared in the following manner: 30 lb. of shellac, 10 lb. Manila copal, and 10 lb. of Zanzibar copal are placed in a vessel, which is heated externally by steam, and stirred during four to six hours, after which 150 parts of the finest potato spirit are added, and the whole heated during four hours to 87° C. This liquid is dyed by the addition of orange color, and can then be used for painting the patterns. When used for painting and glazing machinery, it consists of 35 lb. of shellac, 5 lb. of Manila copal, 10 lb. of Zanzibar copal, and 150 lb. of spirit.—*Ex.*

THAT able periodical, the *North American Review*, remarks that no assertion in reference to woman is more common than that she possesses no inventive or mechanical genius, even the United States census failing to enumerate her among the inventors of the country. But, while such statements are carelessly or ignorantly made, tradition, history and experience alike prove her possession of these faculties in the highest degree. Although woman's scientific education has been grossly neglected, yet some of the most important inventions of the world are due to her. The Hon. Samuel Fisher, while Commissioner of Patents, said: "Any sketch of American inventions would be imperfect which failed to do justice to the part taken by woman." The New York *Times*, in an editorial upon woman's inventive genius, says: "The feminine mind is, as a rule, quicker than the masculine mind; takes hints and sees defects which would escape the average man's attention. Women frequently carry the germs of patents in their head, and cause some rude machine to be constructed which serves their purpose. If women would fix their minds on inventions, it is entirely probable that they would distinguish themselves in this line far more than they have done hitherto." The *Scientific American* testifies of the inventions of women for which they solict patents, that in their practical character and in their adaptation of means to effect a definite purpose, they fully equal the same number of inventions made by men.

Illinois Central Railroad Company.

42d SEMI-ANNUAL CASH DIVIDEND.

A dividend of THREE AND A HALF PER CENT. in cash is declared, payable Sept. 1, 1883, to shareholders of the Illinois Central Railroad Company, as registered at close of business Aug. 11; also, an extra dividend of ONE-HALF OF ONE PER CENT. in cash, payable at the same time to said shareholders out of the earnings of the Southern Division for the six months ending June 30, 1883.

The stock transfer-books will be closed from Aug. 11 until Sept. 5.

L. V. F. RANDOLPH, Treasurer.

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Holds the reins securely in position to be grasped instantly, with a firm hold on the horse's mouth if he be impatient or frightened.

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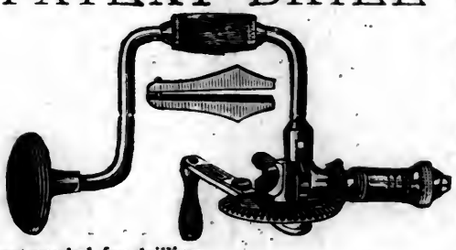
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Many attempts have been made to imitate the outside appearance of our Barber Improved Braces, but no one dares to use our Patent Jaws, as seen in this cut, and no brace is good without them. We guarantee these tools to be perfect in every respect, and that they will give great satisfaction to all who use them. Hardware dealers will furnish them on demand at our prices, or we will forward one by express on receipt of Three Dollars.

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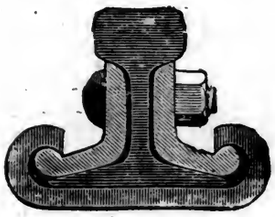
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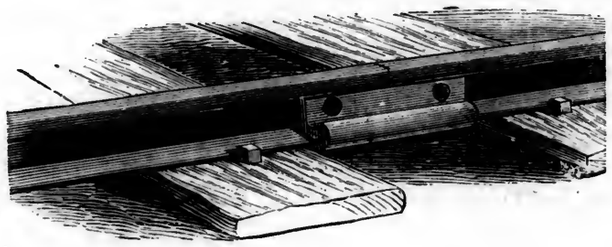
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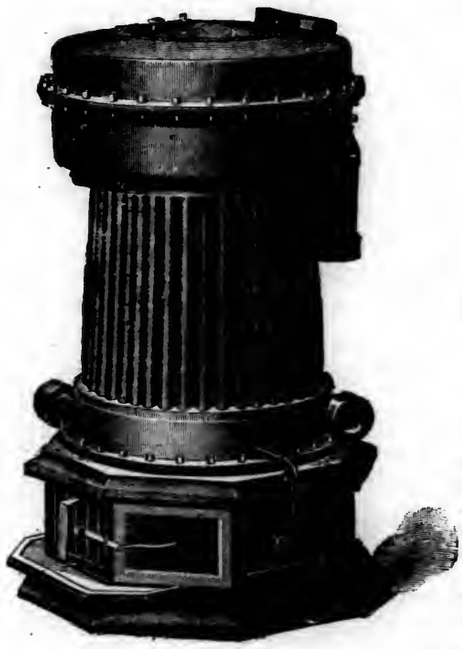
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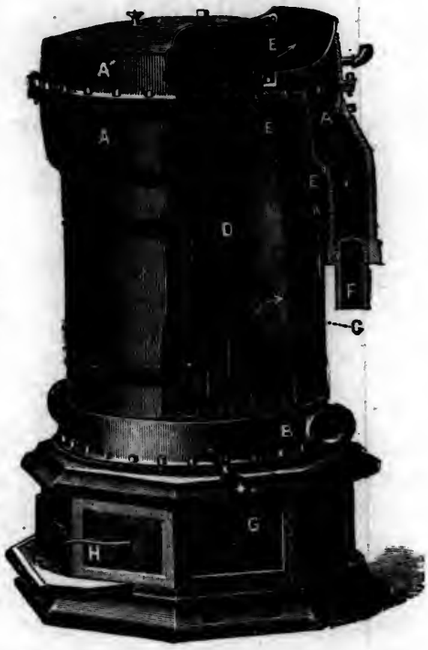
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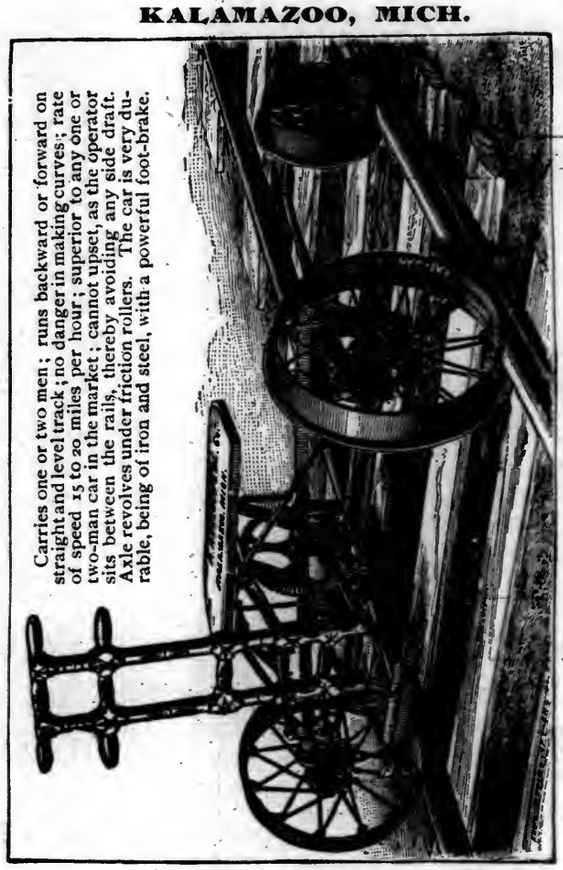
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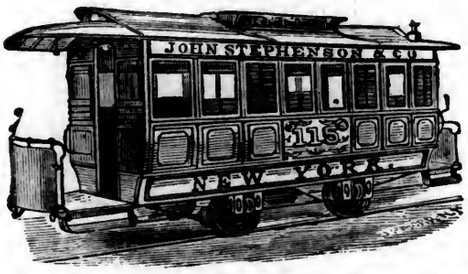
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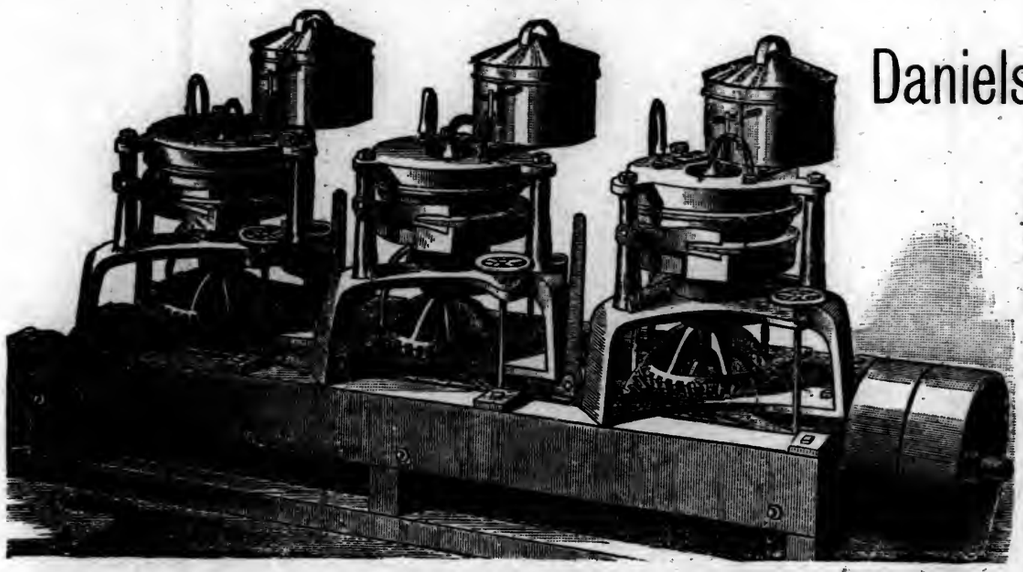
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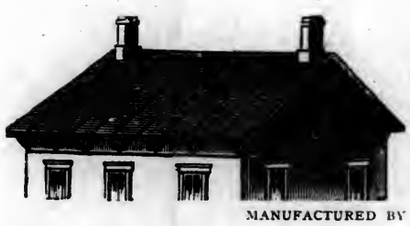


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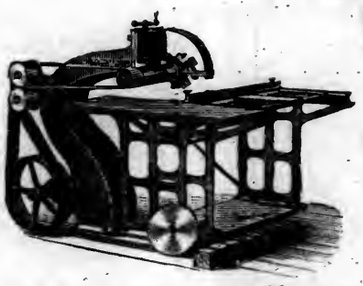
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Railroad Journal
·ESTABLISHED·1831·

Railroads, Tramways, Finance, New Inventions, Machinery.

WHOLE NO. 2,544.] NEW YORK, SEPTEMBER, 1883. [VOLUME LVII.—NO. 6.

Railroad Notes.

WE invite railroad officers to send us notice of elections, transfers, appointments, resignations, etc.; and all our readers would oblige us by furnishing us with any items of news which may come to their knowledge and are of a suitable nature for our columns. It is our intention to publish monthly full and accurate information regarding those enterprises and industries to which the AMERICAN RAILROAD JOURNAL is devoted, and to effect this end we solicit the coöperation of readers interested therein. We aim specially to record all new railway enterprises in the United States and Canada, and to note the progress of construction on all new roads and extensions; and we request those concerned in railway building to give us early information concerning the above, that our reports may be as complete as possible.

THE Merced *Star* says: It is an assured fact that thirty miles of the Turlock and Sierra Nevada Railroad will be in complete running order by the 1st of January, 1884.

THE Mann Boudoir Car Company has closed an agreement with the New York, New Haven and Hartford and the Boston and Albany Railroad companies for running the Mann Boudoir Sleeping Car on the New York and Boston route, by way of Springfield, after October 1.

THE New York, Danbury and Boston Railway Company was incorporated at Albany, N. Y., August 15. It is to run from New York City by the way of Port Chester to Danbury—a distance of fifty miles. Capital $3,000,000.

Returns to the Railroad Commissioners at Albany, N. Y., show that during the six months ended August 1, 160 persons were killed and 401 injured on the railroads of this State.

AT a meeting of the board of directors of the Highland Junction Storm King Bridge Railroad Company, held August 16, Charles S. Hill, representing the Eastern Railway system, was elected president. A communication was read from General J. H. Wilson, president of the New York and New England Railroad Company, agreeing to make a traffic contract with the Storm King Bridge Company to use the road and bridge when completed, and thus make an unbroken line from the East to the coal fields and the West.

THE Philadelphia and Reading Railroad Company has determined to manufacture a longer and much heavier rail than that now in use. The length of the rails now used is thirty feet, and those which the company will soon commence to manufacture will be just double that length. The weight of the latter will be seventy pounds to the yard, as compared with sixty-eight in the former. An especial feature of the new rail will be the uniting of the ends by an angular splice bar, which has been much improved and strengthened.

THE Cornwall and Mount Hope Railroad Company has been chartered to run from a point on the Cornwall Railroad near the Cornwall ore banks to a connection with the Reading and Columbia Railroad near Mount Hope, Lancaster county, Pa., a distance of four and a half miles.

THE Ridgway and Clearfield Railroad, a Pennsylvania Railroad branch, which is being built between the Philadelphia and Erie and the Low Grade Division of the Allegheny Valley Railroad, is ready for the rails. It will be thirty miles in length, and give the Clearfield county coals direct outlet to the West over the Philadelphia and Erie route.

IT is stated that the York and Oswego Midland Railroad Company is taking steps toward building a branch from Wurtsboro, N. Y., through the Neversink Valley to Port Jervis, and thence into Pennsylvania and down the Delaware Valley to the Water Gap. The New York, Lake Erie and Western Railroad Company is looking toward an extension in the same direction, representatives of that line having recently gone over the ground. The immense summer travel which has grown up in the Delaware Valley during the past few years is the incentive to these enterprises. Connection will be made at the Water Gap with the Delaware, Lackawanna and Western, the New York and New England, and the New York, Susquehanna and Western railroads.

THE managers of the Canadian Pacific Railway are said to be considering the project of building a branch line from a point on Lake Michigan across Wisconsin and Iowa to Kansas City.

MR. J. E. LOCKWOOD, general passenger and ticket agent of the Kansas City, Fort Scott and Memphis Railroad, announces the completion of the line to Nettleton, 424 miles from Kansas City, and through daily trains are now running between Kansas City and Nettleton.

THE Long Island Railroad Company has a corps of surveyors at work laying out a route for the extension of the

Long Island Railroad from its present terminus at Port Jefferson through the village to the shore of the bay. At Huntington, also, a similar survey is being made for the proposed extension of the railroad through Woodbury, Cold Spring and Huntington villages to the bay. The villages named are at present two or three miles from the railroad station. It is a part of the plans of the Long Island Railroad Company to reach points on the Sound shore opposite Connecticut and draw business from there to the summer resorts on the island.

THE contract has been awarded for straightening the tracks of the main line of the Philadelphia and Reading Railroad between West Falls and Manayunk.

THE stockholders of the Ohio Central Railroad will consider, at their meeting in September, the proposed lease of the Virginia Division and Ohio bridge of the company to the Chesapeake and Ohio, and the proposed lease of the Columbus Branch of the company's railroad to the Columbus and Eastern Railroad Company.

THE official statement of the business of all lines of the Pennsylvania Railroad Company east of Pittsburgh and Erie, for July, 1883, as compared with that month in 1882, shows a decrease in gross earnings of $18,200, an increase in expenses of $136,159; a decrease in net earnings of $154,359. The seven months of 1883 as compared with the like period in 1882 show an increase in gross earaings of $1,683,533; an increase in expenses of $1,509,188: an increase in net earnings of $174,345. All lines west of Pittsburgh and Erie for the seven months of 1883, show a surplus over all liabilities of $309,690, being a decrease as compared with the same period of 1882, of $45,340.

THE stockholders of the Norfolk Southern Railroad at a meeting in New York on the 15th ult., elected the following directors for the ensuing year: Messrs. Wm. H. Phillips, George C. Wood, E. W. Corlies, Wm. G. Dominick, John N. Whiting, Henry J. Cullen, Jr., James Benedict, Wm. H. Male and Alfred H. Porter.

THE stations to be built along the Schuylkill Valley Railroad will be very handsome in architecture and surrounded by ornamental lawns.

PROGRESSIVE Frenchmen have been trying to force railroad companies to use the cars on the American plan, with aisles running lengthwise, but without much success.

GENERAL WARNER says the Ohio Valley road will be completed within a year. It is to be a great coal road. The maximum grade will be only thirteen feet to the mile, and with grades so light one locomotive can draw a heavier load than five on an ordinary track.

THE annual report of the St. Paul, Minneapolis and Manitoba Railroad for the year ended June 30, 1883, shows that the net earnings per mile during the year were $3,994.62.

IT is expected that the New Orleans and Northeastern, which will extend the Cincinnati Southern into New Orleans, will be completed within ninety days. The trestlework twenty-seven miles in length across Lake Pontchartrain is half done, and the grading is nearly all completed.

MR. SAMUEL BRAY, civil engineer, formerly of Port Stanley, has been appointed engineer on the Ontario and Quebec Railway.

THE July report of the Baltimore and Ohio Employés' Relief Association shows that for the month 610 benefits' were paid to members. In the list were payments aggregating $3,000 for three accidental deaths, and payments for seven deaths from natural causes.

NEW YORK, LAKE ERIE AND WESTERN—The Delaware Division will soon be known as the "flower garden of the Erie," owing to the management of superintendent W. J. Murphy, who has had beautiful little parks constructed, beside and between the tracks, at every station along the road between Susquehanna and Port Jervis. It was an experiment this year, but already these flower gardens along the Erie are becoming the general talk of the traveling public.

THE official statement of earnings of the Philadelphia and Reading Railroad for July gives the gross receipts of the railroad and coal and iron companies at $4,418,840, of which $2,979,093 was contributed by the railroad and $1,439,746 by the coal and iron company. The total expenses for the months were $2,914,493, leaving profits of $1,504,347, a gain as compared with the corresponding month last year of $396,040. The net earnings of both companies for the seven months of 1883 were $7,055,571, being an increase compared with corresponding period last year of $935,649. This statement includes the business of the Central Railroad of New Jersey and branches.

A FLOURISHING ROAD.—The annual report of the St. Paul, Minneapolis and Manitoba Railway Company, for the year ending June 30, was presented at the annual meeting, held on the 15th ult., from which it appears the gross earnings were $9,240,631; aggregate expenses, $4,595,009; net earnings, $4,646,000; interest paid and accrued, $1,264,000, leaving a net income of $3,381,000. Dividends paid, $1,724,664; net surplus from traffic, $1,656,631.36, which, added to income account of June 30, 1882, shows a surplus of $4,929,976.58. The amount of the capital stock is $20,000,000; the amount of funded debt at the close of the year, $20,791,720. The net earnings, after paying fixed charges, were 19 per cent. of the capital stock.

ALL the passenger trains on the Philadelphia and Reading Railroad are now run with the dirt-burning engines. These locomotives have been put on because of their capacity to haul heavy trains at increased rate of speed.

MR. ALLEN MCCOY has been appointed assistant general manager of the New York, Texas and Mexican road, vice C. K. Westcoat, who has been assigned to other duties. Mr. McCoy's headquarters will be situated at Victoria, Tex.

IT is stated that the gauge of the Philadelphia and Atlantic City Railroad will be changed to standard during next month.

THE Philadelphia and Erie Railroad Company reports its earnings for July as follows: Gross earnings, $329,031; expenses, $213,714; net earnings, $115,317; net earnings July, 1882, $160,974; decrease, $45,657. The net earnings for the seven months of 1883, were $807,437; net earnings for seven months of 1882, $734,490; increase, $72,947.

THE Fond Du Lac, Amboy and Peoria Railway has fallen into the possession of the Chicago, Milwaukee and St. Paul Railroad Company. The road consists of only thirty miles of track, and runs from Fond Du Lac to Iron Ridge. The road has a bonded indebtedness of $120,000, of which $100,000 is held in the East.

THE business of the Michigan Central has increased so rapidly of late that it has been found necessary to make large additions to the motive power. The new passenger engines with 18 x 24-inch cylinders have been ordered from the Schenectady Locomotive Works for the Canada Southern Division, and it is expected they will be ready for service in a few weeks. The through travel continues to be very heavy, and in consequence it has been decided to place another sleeper on the Pacific express leaving St. Thomas at 5.10 P. M. for the West. This sleeper will be run through from New York to St. Louis without change. Two are now in use on the morning train.

The Norwalk, Conn., *Gazette* says that the proposed New York, Danbury and Boston road is to run from Danbury to New Milford, where it will connect with the Housatonic, thence northward into Massachusetts, to connect with the shortest lines to Boston, Albany and northern New England. The *Gazette* adds: "It will be seen that this railroad scheme is of far greater magnitude than was at first supposed, and from its important connections with other roads is not wanting in any of the elements of promised financial success.

DURING the past twelve months the Wisconsin Central Railway Company has sold 20,000 acres of its land in Marathon, Taylor, Price, Clark and Adams counties at an average price of $5 per acre. These sales have been made exclusively to actual settlers.

TRAFFIC Manager Vining, at Omaha, reports to President Dillon of the Union Pacific Railroad, that the crops in Kansas of all kinds are the best known for years, while in Nebraska all grains have turned out well, and cattle on the plains are doing well. The California business of the Union Pacific continues satisfactory, and the traffic to the mining region is heavy.

WILLIAM B. STEARNS, president of the Fitchburgh Railroad, died September 3, of Bright's disease in Boston, aged 56 years.

MR. E. D. WORCESTER, secretary of the New York Central Railroad, is in Switzerland with his family. His health is rapidly improving, and he hopes to be able soon to resume his official duties.

BONDS OF THE SAVANNAH, ALBANY AND GULF.—C. S. Hardee, city treasurer at Savannah, Ga., asks the holders of the Savannah, Albany and Gulf Railroad bonds, indorsed by the city of Savannah, who agree to a compromise offered by the city, to present the bonds at the office of Eugene Kelly & Co. in New York, or at his office in Savannah, to be stamped in order to indicate acceptance. The road, which was merged with the Atlantic and Gulf Railroad, is now known as the Savannah, Florida and Western Railroad. Mr. Eugene Kelly, the banker, says that on Sherman's memorable march from Atlanta to the sea, the Union troops destroyed a portion of the road, so that it could not be used by the Confederate Army. To repair the damage the railroad company issued $450,000 in bonds which were indorsed by the city of Savannah. The railroad company failed, and the city of Savannah refused to pay the bonds, which were due Jan. 1, 1877. Suit was brought in the name of Mr. Kelly in the interest of the holders. The city was beaten in the Circuit Court of the United States, and again as an appeal in the United States Supreme Court at Washington. The city had failed on its own bonds and was largely in debt. It now proposed, Mr. Kelly said, to issue $1,300 in new bonds for each $1,000 of the old railroad bonds drawing interest at 5 per cent., and running for thirty years. The railroad bonds drew 6 per cent. There were twelve coupons of $30 each remaining unpaid on them, and the extra $300 allowed was to make up for this interest. It was stipulated that $200,000 of the old bonds must come in before the new ones could be issued. Of this amount $160,000 had already been presented.

OUR valued exchange, *Engineering*, reports that the plan of telegraphing by flashing signals between the islands of Mauritius and Reunion, which we announced as projected some time ago, has been realized by M. Adams. He was obliged to forsake the station of Saint-Rose in Reunion from the difficulty of getting potable water; but the station on Nefles has proved better provided in this respect, though it is further away from Mauritius, namely, 245 kilometres. Observers in Mauritius can read the signals, and thus the proposed telegraph may be considered practicable, though all the arrangements for announcing cyclones, etc., are not yet completed.

IT appears from recent returns that each engine of the Pennsylvania road cost last year, $6.56 for repairs, $6.73 for fuel and eighty-six cents for stores for each 100 miles run. The consumption per mile was eighty-two pounds of coal, 5.3 quarts of oil and 3.8 pounds of tallow. The average of passenger cars to an engine was 5.14, and of freight, 24.5. The average length of train varied from 10.61 cars on the heavy grades to 36.9, while the consumption of coal per car-mile varied from 11.12 pounds to 2.92 pounds. In other words, it costs four times as much to move freight over the mountains as to transport it over average grades.

ON the Hamburg tramways a number of cars, with flangeless wheels, much like omnibuses, and with turning gear, are working. To run on the lines, these cars are fitted with a shaft in front of the front wheels, this shaft carrying on a lever a disc wheel which the driver can lower into the tramrail groove as he requires, or raise it when it is necessary to get out of the way of obstructions. The arrangement is said to work well and save a lot of trouble, the cars running easier than those with flanged wheels.—*Railway Times, London.*

A GOOD suggestion appears in *Harper's Monthly* for September. "I caught the first steamer—*Britannia*, April 20—to Boston, where I took unto myself a wife, and embarked with her for the Sandwich Islands, November 12, on the good ship *Congaree*. Our 'wedding journey' of five months at sea, without sight of land, I commend to all young married couples as the most efficient method of getting acquainted with each other."

A MAGNIFICENT new bridge is in course of erection across the river at Minneapolis, and nearing completion. It will have a double track of rails. The bridge is of stone, and of imposing architecture.

AMERICAN Railroad Journal

·ESTABLISHED·1831·

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NEW YORK, SEPTEMBER, 1883.

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SEVERAL of our exchanges have printed the announcement that R. S. ELLIOTT, of St. Louis, has a book in press, entitled "Notes Taken in Sixty Years," and which contains the following paragraph: "It is a queer and generally unknown fact that the first railroad journal ever issued was published at Rogersville, Tenn., 1830–31. CLINTON ARMSTRONG was then publishing a religious monthly magazine of Calvinistic character, and in addition issued weekly for one year the *Railroad Advocate*, telling its readers about railways, so far as then known, and urging their construction. JOHN A. MCKINNEY, of Rogersville, was a believer in rapid transit by rail, and in an address published in Mr. ARMSTRONG'S *Advocate*, told the folks in butternut jeans that if they had a railroad a man might breakfast in Knoxville and dine in Abingdon! In 1845 CLINTON ARMSTRONG removed to St. Louis County, Mo., to the well-known homestead of the family near Kirkwood, where his sons yet reside." We have no reason to doubt that this is true, but the first number of the AMERICAN RAILROAD JOURNAL was printed in the year 1831, had a national and not merely local character, and was the beginning of a journalistic enterprise which exists after more than a half-century's life, with the prospect of an indefinite expansion of its prosperity in the future. This JOURNAL is unique to-day, among publications of its class, for age and prestige; and in standing and usefulness, to say the least, is numbered with the great representative periodicals of this busy age of the world.

THE average tractive power of the newest American locomotives is twenty thousand pounds, a gain of some seven thousand or eight thousand pounds over those manufactured a decade since. As to average speed, trains are run faster now than previously in the history of railway industry on this continent; and the exceptional rapidity with which some few are run on lines of excellent construction, together with the steady improvement noticeable in road-beds and the demand for higher speed, lead to the expectation of improved results in this particular. The calculation is that twelve millions of dollars are invested in the manufacture of locomotives in the United States, distributed among fifteen firms. An average locomotive weighs nearly forty-eight tons of two thousand pounds, has four driving-wheels, and presents improvements in construction, especially in the cylinder, which were unknown ten or twelve years ago. It is remarkable that American locomotives belonging to different companies are approximately alike, having fewer differences in appearance and construction than English locomotives, for example. The British plan of each company having an efficient and high-salaried man in its employment, whose business it is to study the details of their construction,

with the view to the constant improvement of locomotives, is one which merits the earnest consideration of American companies. We see in a late number of the London *Times* that the best English locomotives, those employed in the running of fast express trains, are good for that service only about eighteen months, although constructed in the best manner. They are afterwards used in ordinary traffic, but virtual newness and continual improvements are the reasons why, so far as the construction of locomotives goes, the express service of Great Britain exhibits its magnificent capabilities in the matter of speed. Straighter and better made tracks are other reasons, of course, but these are less imitable than the admirable system of which we have spoken, of securing the best results in the construction of locomotives.

MONOPOLISTS.

THERE is a growing feeling among a large number of people in this country, against a certain class of persons aggregated under the above heading of monopolists. We either do not understand what a monopolist is, or else we are slow to appreciate the cause of ill feeling entertained. In our mind, the word monopolist means a man who has the entire and supreme monopoly or control of any given thing. If but one man in the world had brains, and no other man could procure any, then the man with brains would be a monopolist. He would be a monopolist too, without any fault of his own, or any credit for being such. He would stand in this great world, of all the countless number born in it, as the one man who brought into the world something no other man could bring into it. Among beings created and not created, we have but one such monopolist, and that being is God himself. He is a monopolist in the work of creating, for no person outside of himself has ever created a single thing. The record of this earth's early history states that out of nothing all things that are now seen were created, and that the being whose matchless power has accomplished this we must call God. We must also call him a monopolist in this particular field, until some one else appears who can make something out of nothing. Now without being blasphemous, no man can claim that any human being can exercise this prerogative of the Divine; and therefore any man who has accomplished anything, has succeeded in so doing by taking advantage of things already in existence, either singly or by combining a certain number of them. Some one may ask, how some man in a community has noticed that certain causes produced certain results, or a combination of certain causes has produced certain results, while all the other men in the community never had an idea on the subject?

The only answer is that the one man has been continually thinking on the result desired, and has steadfastly kept his mind in the direction of the cause until he reached it. When he reached the cause that would produce the desired result, he became master of the situation, but not the owner of the cause, nor the sole beneficiary of the result.

Because of devoting himself to the one object, to the excluding of himself from benefiting himself in other directions, communities have readily recognized the justice of allowing him the pecuniary profits of his enterprise for a given number of years to the exclusion of others, who having neglected this one path, chose other paths in the same hope of remuneration, in which, if successful, they would exclude him.

This man, no matter how rich he becomes or how closely guarded by law his enterprise may be, is not a monopolist. The universal law of bringing nothing into the world and carrying nothing out, leaves in the world all the results of his labors when death removes him. He has not monopolized anything, because he carries nothing with him. On the contrary, he has left the world a great deal better and wiser because of his having lived in it.

The other day some labor unions had a procession in this city, and among other transparencies or banners, was one bearing the sentiment of down with a certain man. There are unpleasant episodes connected with this man's life no doubt, and he has been connected with certain combinations for gain that have proved distasteful to the majority of men. But what about that towering genius that has read men as readily as one reads a book, and successfully operated on the knowledge thus gained? Because he holds control of certain combinations, and is reputed to be worth millions, he is called a monopolist, and a banner is paraded through the streets of New York bearing the sentiment of "down with him."

Many men marching under that banner would willingly change places with him, and bear his unsavory reputation if they could have his wealth. They would willingly adopt the same methods if they only possessed the same fertile brain and daring execution. He is called a monopolist now, but when he came into the world he had nothing, and when he goes out of the world he will take nothing, and when that fertile brain is laid at rest, the power to own and control will cease, and all these properties and combinations must pass into the hands of others. Have then the laboring men no cause of complaint?

Yes, so far as their needs are concerned. The divine law is, that we must deal with a man not according to his deserts, but according to his needs. When this law is taken into account, the laboring man has cause of complaint, because he sees it is not fulfilled. But when we take the question of desert, the cause of complaints becomes very obscure. We know there are immensely rich men who never earned a dollar, but received their wealth

by inheritance, but the number of such is so scarce in the United States that we are not disturbed by them. The majority of large capitalists, however, are more like the men who are so-called monopolists. These men were poor boys, having to overcome obstacles in order to get a foothold. To-day some of them have in their work-shops men who worked with them side by side when they were apprentices. Some of these so-called monopolists have begged for their daily bread, have tramped through the country hunting for work, have struggled with poverty in all its forms. The laboring men of to-day have no more adverse circumstances than had these so-called monopolists when they were laboring men.

What is the difference? Barring the accident of birth and all the untoward circumstances of life, the one difference between the successful and the unsuccessful is, that the former had a purpose in life and bent everything to its accomplishment, while the latter were willing to drift, and could sacrifice business for pleasure.

We have written the above actuated solely by the desire to benefit the laboring man. They cannot pull themselves up by pulling others down. They must study those who are up, and adapting the means to an end, raise themselves.

The Last Spike.

ON the eighth of September last a golden spike was driven which ended the labor of thirteen years, and completed, as was observed by ex-President Billings on the occasion, "the best line across this continent, unequaled in the variety of its resources." The completion of "the new highway between Europe, America and Asia"—the quotation is from President Villard—was, to employ his phraseology again, "an international festival," attended not only by representatives of the executive, legislative and judicial departments of the Federal administration of the Union, by the governors of States and Territories, and by many distinguished citizens of our own land, but by those whose presence indicated, with graceful emphasis, the interest felt in the completion of our new trans-continental thoroughfare by foreign visitors. Moreover, local citizens had assembled in a vast crowd to witness the ceremony, which was accompanied by eloquent speeches, the booming of cannon, and shouts of popular joy. At half-past three in the afternoon of September 8, 1883, when a few blows of a silver mallet on a golden spike completed the Northern Pacific Railroad, Gold Spike, Montana, became a name of historic celebrity. The point of junction thus distinguished is situated about sixty miles west of Helena, Montana.

The history of the project, the consummation of which we record, forms an interesting chapter in the story of the nation's development.

The construction of a railroad from New York to the Columbia River was first proposed forty-eight years ago. In 1845 Asa Whitney, a merchant of New York City, proposed to the United States Congress that a road should be built from the great lakes to the mouth of the Columbia, in consideration of a land grant of sixty miles in width along the entire route. The plan failed to win Congressional approval. In 1853 the Government surveyed five routes to the Pacific. The northern route was laid out by Governor I. I. Stevens, of Washington Territory, and his report was favorable. The subject was pigeon-holed, however, and when it was brought out later, and a charter for the road sought in 1862, the effort resulted in failure. Josiah Perham, a New England merchant, was the man who at last secured a charter, in 1864. In December, 1865, he sold the franchise to some New England capitalists for barely enough to pay his debts, and died three years later, before the first spadeful of earth had been turned on the proposed road. The president of the new company was ex-Governor J. Gregory Smith, of Vermont, and associated with him were Messrs. J. Edgar Thompson, of the Pennsylvania, Robert Burdell, of the Erie, W. G. Fargo, of the New York Central, W. B. Ogden, of the Chicago and Northwestern, and G. W. Cass, of the Pittsburgh, Fort Wayne and Chicago. No progress toward actual construction was made until Mr. Jay Cooke assumed financial direction, obtained legislation authorizing the issue of bonds, and put the bonds on the American market. From the spring of 1870 to the spring of 1872 he sold about thirty-million dollars' worth of bonds. Work was begun on the road in 1870 at Thompson Junction, twenty-three miles west of Duluth, and also at Kalama on the Columbia River. In 1871 the road was finished from Thompson Junction to the Red River of the North, and 1873 saw it extended to Bismarck, on the Missouri River, while by that time 105 miles had been finished between the Columbia River and Puget Sound, and the terminal city of Tacoma laid out. The panic of 1873 destroyed Mr. Cooke's banking house, and left the railroad paralyzed with a large floating debt, and a bonded debt of thirty million dollars, at seven and three-tenths per cent interest. Earnings on the completed portions hardly paid running expenses. Few settlers moved into the country along its line. President Smith resigned and was succeeded by Mr. Cass, and he was in turn succeeded by Mr. C. B. Wright, of Philadelphia. In 1875 a reorganization of affairs was effected, the bondholders accepted preferred stock in lieu of their bonds, the road was hurried through the bankruptcy court, and by 1879 it had paid off its floating debt and was earning some net profits on the completed portions. A thirty-mile road was built from Tacoma to the Cascade Mountains coal beds. Wheat culture was begun in the Red River Valley, and settlers flocked in rapidly. Work was carried forward at both ends of the route. By 1880 President Billings had secured funds for filling the gap in the track—more than eight hundred miles, across Montana—by a loan of forty million dollars negotiated by Winslow, Lanier & Co., Drexel, Morgan & Co., August Belmont & Co., of New York, and J. S. Morgan Co., of London. In 1881 a controlling interest was purchased in the road by Mr. Henry Villard, who was largely interested in various transportation lines in the Northwest. He obtained eight million dollars, by a "blind pool"—that is, the money was contributed by capitalists, to be used by him as he saw fit, and on no security except his personal receipt. In September, 1881, Mr. Villard was elected president, and his former associate in Western railroad management, Mr. T. F. Oakes, vice-president. At the beginning of 1883 only three hundred miles of track remained to be laid, on most of which line

the grading had been done. During the summer this gap was closed up, making the iron highway complete and ready for travel from Duluth to Tacoma, a distance of a little more than 1,980 miles. There are also 674 miles of branches, mostly completed, giving a grand total of more than 2,654 miles of road.

The Vanderbilt Lines in Pennsylvania.

THE Cleveland *Herald* reports that the Vanderbilt system is the second great trunk line assured to Pittsburgh. Philadelphia and Reading gives entrance to New York, Philadelphia and Harrisburg. The Pittsburgh and Lake Erie, lately passed into Mr. Vanderbilt's hands, gives line connection with Lake Shore. Contracts for grading the Harrisburg and Western, 220 miles long, to be built by the Vanderbilt-Gowen syndicate, will be let in September. The Pittsburgh, McKeesport and Youghiogheny will be opened this month. The Youghiogheny road passes between the banks of the Monongahela and the tracks of the Pittsburgh, Virginia and Charleston to Homestead, where it crosses the river. Ir recrosses the Monongahela at McKeesport, and then follows the left bank of the Youghiogheny to Dawson. From Dawson there is a four-mile branch along Dickerson Run for coal and coke. The road is building to Bradford, where the West Youghiogheny branch, which has passed out of the hands of Baltimore and Ohio, connects the road with Connellsville. By this road, which runs to Summit, near Scotdale, and is being extended to Mount Pleasant, Mr. Vanderbilt will get a large coal traffic. A branch to Uniontown for a coke traffic, and to Bellevernon, on the Monongahela East Shore road, to the undeveloped coal country are projected. The construction of a branch line eighty-nine miles to the Virginia state line, to be known as the Monongahela East Shore road, was begun two weeks ago. This road begins at McKeesport and runs to Port Marion. It will go into the rich mineral section of Virginia, and will open up an iron trade which may seriously interfere with Lake Superior and foreign ores. The Baltimore and Ohio people have not been idle during the activity of the Pennsylvania and Vanderbilt people. During the year they have purchased the Pittsburgh Southern road, between Pittsburgh and Washington, Pa., and built the Streets Run Branch to connect with it. This new road, in connection with the Washington and Wheeling Railroad, gives a direct line from Wheeling to Pittsburgh, and saves a haul of 100 miles in reaching the southwest connection of Baltimore and Ohio.

WORKS OF THE CAMBRIA IRON COMPANY.—A writer in *Harper's* for August, expatiates on these in the following language, which is one of many quotable passages in "The Heart of the Alleghanies." "A little higher, at Johnstown, in the valley of the Conemaugh, we encountered the works of the Cambria Iron Company, which roar and flame proudly, as if aware that they constitute probably the biggest single iron and steel works in the world. The company employs 8,000 operatives; keeps nine furnaces going at this place and four elsewhere; has perhaps eighty acres under roof at Johnstown; mines 700,000 tons of coal a year for its own use, and does annually a business of $18,000,000 or $20,000,000. It produced in 1881 45,000 tons of iron rails, and 120,000 tons of steel, saying nothing of steel springs in quantity, boiler iron, or the machinery manufactured for its own use. It is worth recording that eminent foreign mechanicians have admitted that at Johnstown three times the amount of work is done which would be accomplished with the same plant in Europe. In and out of the shops and all through the yards wind forty miles of track, on which trains loaded with ore, coal, slag, or hot ingots of steel are running every moment or two, eighteen locomotives being kept in use for this purpose, and several stackless ones for running into the adjacent mines. The steel ingots, by the way, are the largest steel castings made anywhere, excepting Krupp cannon, and weigh 5,500 pounds each, meausuring eighteen inches and a half square, and yielding eight rails apiece. The works were founded at this spot with the idea of utilizing the iron ore of the vicinity; but steel has now become its supreme object, and ores are brought from Spain, Ireland, Elba and Michigan, to mix with the local brown hematites. The direct coal flame is not used in fusing the ore, but only the gases generated from coal. This intensified heat is stored in Whitworth stoves—immense iron-bound cylinders like chimneys, inside of which the temperature is 1,700° Fahrenheit. Thence it is distributed through pipes wherever it is wanted; but first the burning gases are passed through a receptacle charged with water, which actually *washes the fire*, so as to remove various constituents that might coat and injure the tubes through which it is conveyed. The calorific agent thus prepared not only supplies the furnaces, but runs the hydraulic and other engines, and is in part carried back to the stove to begin over again. So that, said Mr. Webb, the general superintendent, we come as near to lifting ourselves by our own boot-straps as is possible."

CHIEF ENGINEER STONE submitted a report which was adopted at the recent meeting of the Board of directors of the Florida Ship Canal and Transit Company. The following passage is quoted from it: "I have computed that a tidewater ship canal of sufficient width and depth to allow the passage of two sea-going steamers of the first class without inconvenience, can be constructed at a total cost of $46,000,000, as follows: Excavations, $36,000,000; harbors at termini, $4,500,000; engineering, right of way, and contingencies, $5,500,000. The total length of the canal would be 137½ miles, and the highest elevation in crossing the watershed 143 feet, but this deep cut would be only for a short distance.

The saving of distance to steam vessels between New York and New Orleans would be 500 miles; New Orleans and Liverpool, 412 miles; New York and Pensacola, 600 miles. The gain by avoiding the dangerous passage through the Florida Straits would be very great, and not the least important commercial advantage of the proposed canal would come from the saving on insurance, which is now much heavier for Gulf ports than for South Atlantic ports, and in the expense, which on a large steamer is from $500 to $800 a day." Governor Brown expressed the belief that parts of the work would be under contract in ninety days.

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RAILROAD MEDICAL SERVICE.

BY S. S. HERRICK, M.D.,
SECRETARY BOARD OF HEALTH, STATE OF LOUSIANA.

ITALY CONTINUED.

IN 1863 the Relief and Pension Fund (*La Cassa di Soccorso e di Pensioni*) was created by a ministerial decree for the benefit of the *personnel* of the State railways, and in 1864 the Mutual Relief Association (*Il Consorzio di Mutuo Soccorso*) was organized among the employés of the railroads of Lombardy and Central Italy. These went out of existence in 1870, and a new Mutual Relief Association was organized of the *personnel* of all the lines belonging to the Railway Company of Upper Italy. The regulations of this society are before me, and a free translation is made of the most important portions.

This institution has for its purpose: 1. To provide relief and medical attendance for those employés who are members. 2. To aid, by a daily allowance, those employed by the day, when their wages are stopped. 3. To provide indemnity for the expense of medicines purchased. 4. To meet funeral expenses, in case of death. 5. To afford extraordinary donations once for all, or donations renewable yearly, in addition to the funds granted by vote of the committee—(a) to widows and minor children; (b) to surviving parents, who were dependent on the employés, if needy and unable to work; (c) to employés superannuated or disabled for work by some grave malady; (d) to members who, after a definite period of illness, have forfeited right to ordinary relief.

Membership in the association is obligatory upon the following: 1. All operatives in the shops and in the department of *maintenance;* 2. All employés temporarily belonging to the various branches of the departments of *operation* and *maintenance;* 3. All those belonging to these two departments, whose annual wages amount to less than 1,200 *lire* ($240); 4. Finally, all employés hereafter admitted for the first time to either of the permanent occupations must join the association, subscribe to all the conditions, including deduction of wages for days of sickness.

Employés who were not members of the Mutual Relief Association at the end of the year 1869, have the privilege of joining on the following conditions: All applications for membership must be transmitted by employés through their respective foreman within thirty days from date of publication of the present regulations. Applications drawn up in prescribed form shall contain express agreement to submit (a) to the regular deduction of wages hereafter noted; (b) to deduction of wages during the period of sickness; (c) finally, to all the obligations and rules laid down in the present regulations. All employés who have not made known, within thirty days, their determination in the manner stated, shall be inscribed at the office of the Association and subjected to all the obligations of the present regulations, including deduction from wages during the period of sickness. Those who, on the other hand, have decided not to join the Association, will remain subject to the respective social and governing regulations in force at the end of 1869. Employés in the departments of operation and maintenance, having wages less than 1,200 *lire per annum*, will not be enrolled, when assigned to the central and affiliated offices in the departments of direction, of traffic, of equipment, of traction and of maintenance (repairs).

Hereafter no one will be admitted to membership who does not make declaration, supported by a medical certificate, that he is of sound and strong constitution, free of organic defects, and not over a certain age.

The capital of the *Consorzio* is composed of the funds derived from liquidation of the suppressed organizations previously mentioned, and will be augmented as follows: 1. By a deduction made upon salaries or wages of members, whether participating or not in the Pension Fund (*Cassa-Pensioni*). 2. By half of the deductions imposed on employés or permanent agents on account of sickness or absence. 3. By all fines imposed by the administration. 4. By the sale of articles left in station-houses or carriages, and those found along the lines, less the portion due to the finder; also of goods abandoned by their owners, provided the price realized exceeds the cost of transportation together with storage and expense of keeping. 5. By the interest on the investment of the capital of the Association. 6. By donations and legacies.

The deduction from wages is fixed at one and a half per cent. for workmen in the shops; and one per cent. for all other employés, whether upon yearly salaries or daily wages.

Any contributor to the Association falling sick and giving immediate notice to his foreman on quitting work, will be entitled, after the third day of sickness duly certified, (a) to relief and gratuitous attendance from the local physician of the *Consorzio* from the first day of sickness; (b) after the third day of sickness duly certified, to a daily allowance during the course of the illness and convalescence; (c) to a final indemnity for the cost of medicines, to be determined by the committee according to the funds of the Association, on presentation of the original bill of the apothecary endorsed by the local physician and compared with his prescriptions, according to a scale of prices published by the Association. The committee will fix quarterly in advance the available amount to be applied to the aforesaid indemnity, which will be divided equitably according to the whole amount of claims. The allowance will consequently commence from the fourth day of notice given to the foreman. The patient who has gone to a hospital, sanitary establishment, watering place, etc., on the day stated in the notification, will be entitled to an allowance from the first day of the sickness, leaving to his cost the expense of medical attention and recovery. The expense of transporting the sick and wounded to the hospitals falls upon the Association. In the choice of hospitals and sanitary establishments, the physician will give preference to those which afford gratuitous attention; otherwise the daily charge will be confined, if possible, within the limits of the allowance.

The foreman, on receiving a sick report of any man in his charge, immediately notifies the local physician, who visits the case and reports the result of his examination to the sanitary inspector of the district.

The patient who leaves his usual place of residence by permission, must first obtain from the local physician a certificate of sickness and of its probable duration. On this certificate will be endorsed by his succeeding medical attendant the progress of his case and its confirmation by the signature of the sanitary inspector. A claim for relief

beyond the expected duration of sickness, as noted in the medical certificate, will be determined by the committee of the Association.

Whoever simulates disease or adduces false certificates of sickness, and whoever, while receiving sick-relief, engages in any work, forfeits membership in the association together with all contributions paid in; and may be required to reimburse the allowances already obtained, besides other disciplinary measures. Whoever is disabled by disorderly conduct, vice or injuries received in brawls, has no claim to relief. In aggravated cases the director general may demand from the committee summary expulsion of an offender from the association.

The daily allowance to an employé during illness and convalescence, after contribution for one month, is one-third of his daily wages; after two months' contribution, one-half; after four months' contribution, two-thirds of his regular wages.

According to the rules, relief terminates after ninety days of sickness; but the invalid may receive allowance for another period of ninety days during the same year, by decision of the committee, provided the funds of the association allow it. The man's foreman will make a special report upon the claim for this extension of relief.

The record of those injured in service is made upon declaration of their immediate foreman, supported by the certificate of the attending surgeon. The foreman, at his discretion, can have the circumstances of the injury certified by the proper sanitary inspector. Men injured in the line of duty continue to receive wages from their respective branches of service, and consequently have no claim upon the *Consorzio*, except for medical or surgical attendance. In an emergency, whenever the *Consorzio* has anticipated pecuniary relief to those injured in service, or expended money for surgical appliances, hospital charges, etc., reimbursement will be made by the proper branch of service. Employés belonging to the association, whose duties require them to live in marshy and unhealthy localities, subject to fevers or epidemics, have all the privileges of those injured in service. This category includes insalubrity due to such permanent conditions as cultivation of rice, stagnant water, marshes and sewers, which induce endemic or miasmatic diseases. The same applies to those employed in long tunnels, whenever their malady can be attributed to this condition.

The committee in special cases can likewise grant extraordinary allowances once for all: 1. To those suffering from prolonged illness and in absolute want. 2. To those in advanced age or burdened by grave infirmity or rendered incapable of work of any kind. 3. To widows or minor orphans, in case the deceased has contributed to the association not less than three years. 4. To the widow and minor children of an employé deceased through injuries or disease contracted in service will be granted an allowance equal to three months' pay, the other allowances being at the charge of the service to which he belonged, as may be judged equitable. In granting these allowances two-thirds of the committee must agree; and, as in case of allowance renewable from year to year, the committee may require proof of birth, marriage, cohabitation, indigence and death, as the case may be.

After an account taken of the financial standing of the *Consorzio*, every year a fixed amount is appropriated for annual allowances, to be distributed among those entitled to the same according to seniority and contributions made to the service to which they belong. The allowance renewable annually varies from half a *lira* to one *lira* daily, at the discretion of the committee, but only to workmen in the shops and others who, contributing to the *Consorzio* at least ten years, do not belong to the *Cassa-Pensioni*. In the determination of allowances, account will be taken of the length of service of the claimant or deceased, of the widow's age, of the number of minor children, and regard will likewise be paid to their morality. The application for an allowance renewable annually, with copy of the record of the applicant or deceased, must be transmitted to the Director General, as President of the committee of the association, through the proper division-foreman, who will endorse his opinion on the correctness of the statement, and on the petitioner's title to the demand.

Extraordinary allowances, which are renewable annually, always depend on the financial situation of the association, and are revised yearly, regard being paid also to the condition of the beneficiaries. The annual allowances granted by the Mutual Aid Association of Lombardy and of Central Italy, as well as Venetia, will cease to the widow in case of second marriage, and to the orphans on reaching the age of 15 years.

Funeral expenses, to the amount of 30 *lire*, will be paid by the association, on presentation of the death-certificate. In case the expenses fall short of this sum, the difference will be given to the family.

Whoever withdraws for any reason from the company's service or ceases to contribute to the association through increase of pay or change of employment, can not claim reimbursement of his contributions, although he may not have profited thereby.

Applications for relief for days of sickness occurring in different months will not be received on one and the same register.

In the exceptional case of retroactive claim for relief, the immediate foreman must draw up a precise statement of the reasons of the delay, so that the grounds of the claim may be properly estimated.

Whenever it shall be found that relief has been improperly granted, through an incorrect or false declaration, the employé will be held responsible.

(To be continued.)

MR. W. D. CHIPLEY, vice-president of the Pensacola and Atlanta road, has issued a circular protesting in a forcible but dignified way against the increased taxation imposed by the State of Florida upon its railroads. The assessment placed by the State upon its railroads is $7,705,209.72, against $4,726,942.40 last year. The assessment of the P. and A. road is $1,610,000. Mr. Chipley thinks that the figures of the current year are oppressive, and discriminate against the railroads.

A LADY writes to a London newspaper suggesting that a clock in the waiting-room of a railway station, is a greater boon to the traveler, than the neat array of texts and Bibles with which that dreary apartment is generally furnished.

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The Railroads of Venezuela.

REPORT BY CONSUL BEACH, OF PUERTO CABELLO.

THE following interesting article is from the last number of the Consular Reports, published at the Government Printing Office, Washington:

The first railroad built and operated in Venezuela began at Puerto Cabello and led to the westward, along the strip of land between the Bay of Trieste (the bay is an extension of the Caribbean Sea) and one of the Andean ranges, which varies from one mile to two miles in width. This strip of land is a joint formation produced by a wash-down from the mountains and a wash-up from the sea, and is nearly dead level. When the road was projected, it was with the intention and expectation that it would be extended for a distance of about seventy miles, and in its course to reach one or two interior cities. From the levelness of the route and the sandy character of the soil the work of grading was neither difficult nor expensive. About ten miles of the road was put into operation, and kept in operation for a few months. Financial embarrassment followed; the cars stopped running; the rails were taken up and shipped away, and now nothing visible remains of the enterprise but an outline view of the nearly jungle-overgrown road-bed.

Tucacas is about thirty miles to the westward of Puerto Cabello. From Tucacas to the mines of Aroa, where copper mining is prosecuted, the course is southwesterly, and distance fifty-five and a half miles. Between these places an English company, about the year 1870, built a two-foot gauge railroad, mainly for use in connection with mining. The topography of the country permitted the road to be built in almost an air line, it having but few slight divergencies. The obstacles met with in its construction were many, and some very formidable. For a large portion of the way there were trees of great size, and a dense jungle from twenty to thirty feet in height. From the nature of the obstacles it became necessary that the building and surveying of the road should be conducted in conjunction, and the line of the road was sometimes determined by the compass following those who cleared a place for the track. A severe type of malaria abounded; poisonous reptiles were frequently met with, and tigers and other wild animals were quite numerous. The fertile soil was full of roots, rendering the grading of the road a very great labor. A few small streams were crossed, the largest requiring a bridge of ninety feet span. The bridges are iron structures, the railroad ties are of iron, and even the telegraph poles along the line are of the same material. The road appears to be substantially constructed, and the cars run very smoothly. For twenty-three miles from Tucacas the grade of the road has made an ascent of one hundred and fifty feet. Near the western terminus of the road the mountain is approached, and at the distance of fifty miles from Tucacas the elevation is seven hundred feet. The road for the last five miles has an upward grade of six hundred feet, requiring especially constructed engines for the movement of trains. There are nine stations on the road—all mere stations, except Tucacas, the starting-point, with a population of 1,200, and La Luz, the practical terminus for general business, fifty and a half miles from Tucacas, a village having a population of about 3,000. The freight cars of the road carry from five to six tons, and the passenger cars about thirty passengers. Of late years the road has, in addition to the copper ore, freighted considerable coffee and other general merchandise of the country, coming mainly from Barquisimeto, a city of 29,000 population, sixty miles beyond La Luz, with which it is connected by a coach and cart road. The passenger business of the road is very light.

A railroad from La Guira to Caracas has been in process of construction for several years. The distance by a foot-path over the intervening mountain is eight miles, but by the necessarily circuitous route of the railroad line it is twenty-two miles. Caracas is twenty-six hundred feet above the sea at La Guira; but in passing over the lowest point of the intermediate mountain an altitude of three thousand feet is attained, from which there is a descent both ways. The track of the road is three and a half feet gauge. The grade over the mountain is uniform three and a half per cent. The road is built on a series of reverse curves, having a radius of one hundred and forty feet. Caracas is directly south of La Guira. In starting from La Guira the course of the road is westward, but it circles around to the southward in ascending the mountain, and the whole forms a large semicircle as it reaches its southern terminus. In building the road work was begun at La Guira, and it has progressed from that point. The northern end of the road has been completed for over a year, and is utilized for the transportation of material used in its construction. In recently riding over the coach road between the cities named, which for much of the way is near the railroad line, I was enabled to observe the work as fully completed and as incomplete. Great scientific skill has been displayed in the engineering; the work is well executed; and, judging from the large force of men employed, the road will doubtless be in running order its entire length by the first of July next, the time of opening fixed by its managers, and which is the time set for opening the international exhibition at Caracas—both openings to be celebrated in conjunction. For a considerable part of the way the road passes along the precipitous sides of the mountain, having a surface of earth and shale rock, which is liable to be carried in large quantities upon the track by heavy rain showers, and which will be the greatest obstacle the operating of the road will have to contend against.

Surveys have been made for other railroad lines, and a small amount of grading has been done on a proposed road between Puerto Cabello and Valencia, distance about forty miles, with intermediate mountain elevation of eighteen hundred feet.

IN VALLAMBROSA.—One may remain in the city all summer with social impunity; neither the baths nor the mountains are imperatively prescribed; but it is not "the thing" to be seen there in September and October. Nay, in some of the smaller cities, where the old customs linger longest, the matter is carried so far that those who have no villas, and can not by any means procure an invitation to other people's, deliberately shut themselves up at home with the front shutters closed, and are charitably supposed to be *in villeggiatura* for the period required by fashion. The time of vintage is indeed a charming one in the country; it was just over as we passed through the Val d'Arno, and both masters and peasants looked happy, for it had been a fruitful season, and wine and oil and bread were plentiful.—*Harper's.*

The Formation of Water.

BY W. L. SILVEY.

STRANGE as it may seem, yet it is none the less true that our greatest investigators, such as Darwin, Tyndall, Huxley, Faraday, Davy and others, were often too eager to reach a great conclusion, and therefore often missed the very thing for which they sought. Such seems to be the case with this great and abundant fluid—water—which by its agency has wrought more changes than any other element of our planetary existence. In most cases the investigator acknowledges its being, and after an analysis of its component parts is satisfied to let the subject rest, without stopping to inquire its origin.

Going back into the dim vista of the past, before the earth had a planetary existence, we see an immense mass of incandescent gases revolving on its axis and performing a great planetary circuit in space in unison with the other planetary machinery, varying not a line from its allotted path. This great planet we call the sun. Ages upon ages, and millions of years upon millions of years this great igneous mass sailed in space, lighting up its grand orbit with the electric flame of its existence. How long this continued we are unable to calculate, but in the course of cycles great changes were wrought, and at various periods planets were launched into existence. How this was accomplished, may be determined by the following experiment:

Let a large flexible rubber ball be filled with water, and an axis provided on which to rotate it, so arranged that the walls may approach each other at the axis or poles without losing the fluid. Now revolve it by means of the axle, and the ball will first begin to contract at the poles, expanding at the equator; and if the speed be increased this expansion and contraction will so advance that it will assume a disc or grind-stone shape and finally burst at its equatorial or outer rim. Such was the plan on which planets were formed. First an atom began collecting its neighbors until finally a mass was formed, which became the nucleus for the collection of other atoms and fragments of planets and comets, and the thousands of parts of attenuated matter which constantly pervade space. All the time that this accumulation of atomic gases was going on, the same axial speed of rotation continued, until finally, the equatorial diameter having become very large, the sun assumed a disc shape and the speed became tremendous.

Revolving as the sun does, in a perfect vacuum whose temperature is about 250 degrees below zero, it is evident that the outer surface would gradually cool off, and the centrifugal force would carry the cooled part to the outer rim of the disc-shaped planet until an opaque ring was formed at the equator. After a time this ring, through a series of contractions and expansions, broke at one side, becoming loosened from the core around which it was formed, and by so doing, one part traveling faster than the other, owing to the imperfect contact, the ring is gradually pushed into a solid body and then becomes a semi-solid mass or huge mountain on one side of the gaseous planet. By the constant revolution of the sun, this cooler part was slowly detached from the main body until the last hold being broken, it was launched into space to become a satellite. Space having no gravity, it is evident that the satellite thus formed will be projected a distance proportioned to the speed it assumed while still part of the sun. This accounts for the various distances to which the several planets were thrown.

First, Neptune was thrown off, and its great distance from the center shows that the surface speed was very great at that time. Then in order come the other planets, until Mercury, the last as yet to be thrown off; each one of the planets occupying a position from the sun proportioned to the surface velocity at the time of its formation.

Among the planets thus formed was the one on which we live, the surface speed at the time of its formation being sufficient to project it a distance of about 95 millions of miles. The earth at this time was undoubtedly very intensely heated, enough so in fact to convert into a gaseous form every substance then in existence. Revolve a grind-stone on which water is dropping and at a certain speed the water will be thrown off in drops. Observe the drops thus formed, and it will be found that they assume a rotary motion, revolving on their own axis at a speed a little less than the object which produced them.

On this same principle, the earth received its diurnal motions at the time when it was projected from the sun. After the earth had become a fixed satellite, and continuing its revolutions for some time, it became somewhat the shape of the gaseous central orb from which it sprung—that is of a somewhat discal shape—and a ring of semi-solid matter forming, which was finally broken at one side and pushed together into a huge globule, which, becoming loosened and finally detached, was thrown off to become a satellite for the earth, and this satellite we call the moon. Since a satellite can only be projected into space a distance proportional to the surface velocity of its progenitor, it is evident that the moon could only be thrown from the earth a much smaller distance than the earth from the sun. Hence it was only thrown a distance of about a quarter million of miles.

To account for the great difference of temperature of the earth and the moon, they having been projected from the sun at the same time, and the moon having been evolved from the earth after it had assumed its planetary orbit, it is sufficient to notice the different temperature of the two at the time of the evolution. The ring which formed around the earth and which was finally transformed into the moon as before described, must have assumed a much lower degree of temperature than its parent, or it could not have been formed or projected into space. Since it was so much colder than the earth at the time of its formation, and being so much smaller, it is evident that the moon would become cold a great deal quicker than the earth. When we look at the moon and consider its great frigidity, we can readily imagine the condition which the earth will eventually assume. Of course the moon is not as cold as it will be, for the temperature of space is far below its present temperature, and of course an equilibrium must eventually be formed which will reduce the moon and even the earth to a condition of frigidity which it is difficult for imagination to picture.

Since the moon was at one time part of the earth, it is evident that there was a time when there were both water and air upon it, and as it has been proved that there is at present little or none of either, the question arises, What has become of them?

At the time of the formation of the planetary system

there were a great many more elementary substances than there are now; at that time there might have been thousands, but in the course of cycles (according to temperature and different conditions) the different gases would unite and form new ones, the old or primary ones being entirely destroyed, until to-day we can reckon only sixty-four single elements. How many each one of these may have supplanted, scientific inquiry will probably never unravel, but that every substance which we have is simply a combination of elements may be readily determined. Even the granite pebble, when introduced into the flame of the electric light, will be converted into a gas and may then be analyzed. So it is with every substance of which we have any knowledge; they are simply a combination of elemental principles. As both air and water have disappeared from the surface of the moon, the question arises, What has become of them? When water has been treated with an electric current it is separated into two gases, oxygen and hydrogen, while air is composed of oxygen and nitrogen. From this we see that in order to destroy these two great ingredients of nature, it is only necessary to separate the oxygen from them.

That gases have already been almost entirely destroyed, may be proved by an examination of the coal fields and the lime-stone beds. Were all the gases of which they are composed to be liberated at once, the earth would become unfit for the residence of animal life, and animated nature would soon don the sable robes of death. As our carbonic acid gas has nearly disappeared, and our vast coal fields been laid down, so it is with every other gas; those having the greatest affinity unite, and a new solid or gas is formed according to its specific gravity. In this way the water and air have disappeared from the moon. First one gas formed an affinity for another, they uniting formed a solid. This left the rest to unite with some other for which it had an affinity, until after many changes each gas has been converted into a solid, and finally the planet has become barren, cold and tenantless. *As every substance was at one time a gas, so in time every substance must become a solid.* But how was water formed?

Well, after ages and ages had elapsed, and the planet had assumed a globular form, a gradual cooling process began until a crust was formed. Of course it is not to be supposed that this remained permanent, for occasionally the pent up gases of the interior would crack the thin crust, and large quantities of the molten interior would pour out, which in process of time would cool down to form mountains and mountain ranges; while in other places great depressions would be formed, and in this way the surface was gradually converted into a very irregular form. Change after change having been accomplished, and the earth becoming gradually cooler until a certain temperature was reached, the preparations were complete for the most stupendous effort which nature has made since the evolution from the sun. Heat two gases to a given temperature, combining them in a certain proportion, and they may be ignited and exploded. By uniting oxygen and hydrogen gas in a given proportion, at a certain temperature, they may be exploded by the electric spark, and if they have been confined in a receiver it will be found that water is formed. As long as two gases are heated above a certain temperature they will be too rarified to unite or explode. Hence it was that although the two gases, oxygen and hydrogen, were gradually reduced to proper proportions to form water, yet the temperature was so high as to make the compound too rarefied. Finally the temperature was reached at which it would explode, and one of the fiery meteors which are constantly dropping upon the earth, entering the gaseous cloud, all at once the whole body was ignited with a tremendous explosion.

Methinks I can hear that awful sound; more awful than the combined efforts of all nature's artillery since that eventful day. Grand was the sight! more grand than the united efforts of a thousand Ætnas and Cotopaxis. At its sound the whole earth trembled, and the surface thereof heaved like a billowy sea. Huge rents were formed, into which the mountains melted away. The hills tumbled into the valleys as if by fright, while the crash and roar, and the lightning's flash lent inspiration to the scene. The volcanoes belched forth their shining lava to run down the mountain sides and envelop all in a burnished cloak of liquid fire. High over all, the serpent-tongued flames darted hither and thither, as if it was their mad purpose to lick the very face of the sun himself. Such was the scene which occurred when the two gases, oxygen and hydrogen, united to form water. But the great drama was not yet completed.

It is true water was formed, but the heat which was thereby generated, was so intense as to raise the temperature of the whole earth to a degree that would melt almost every substance; and although water was formed, yet the intense heat was sufficient to maintain it as a superheated vapor.

During this ferment of nature, many of our rock crystals were formed, and the conglomeration of much of our fine granites took place. The varied effects of these transformations are still visible in Vesuvius, Ætna, Cotopaxi, and more than two hundred other volcanoes which now afford an exit through which the vapor and gas of the interior finds a path.

After things had remained in this condition for a great length of time, the earth began to cool off, and what was at first a vapor then became a light mist that, rising to a great height, would be converted into rain drops which would fall on the highly heated surface of the earth, to be immediately turned into vast volumes of super-heated steam. In fact, a fiery ordeal held high revelry over the surface of the entire globe. In places where the surface had become somewhat cool, the rain would sometimes collect and form shallow seas, but even these were boiling hot.

By-and-by, through a gradual softening and various chemical changes, the bed of these seas would give way, and the boiling water would pour through the rent into the interior. Owing to the high temperature, this would generate vast volumes of steam which, having no outlet, would cause earthquakes, and finally heave up a mountain that would become a volcano through which the pent up steam could find exit.

All nature would quake at the time of these mighty changes. The old volcanoes would belch forth their thunders with renewed vigor, while the new ones, as if in rivalry, would dart their fiery-tongued flames high into the vapory cloud above, as if to quench their thirst with the vapor before it fell. Gradually these great elemental storm changes grew milder and milder as the centuries advanced. The temperature having slowly subsided, the

rains became more copious, until there came a time when a great flood pervaded the whole planet; the vapor rising would be condensed and fall back to keep up the rotation. These floods washing the mountain sides, the various kinds of rock gradually melted away, forming the alluvia; but in so doing the elevated rocks were worn away until the last vestige of high land disappeared beneath the waves of the vast planetary ocean. The winds blew and the lightning flashed, and the thunder rolled, and the waves beat and tossed against each other, but not a vestige of land appeared above the waste of waters.

Until then, not an insect or an animal was formed to behold the battles of nature, but as climatic changes control races of to-day, so it was then; that as nature was prepared for the support of animal life, the germ began to develop which finally culminated in the production of animal life. Of course the first animals were of the most primitive form and habits, but climatic changes so regulated it that from the most simple germ of organism there finally developed the higher forms of animal life.

The race of man is but an improvement over the lower animals as they are over the still lower, each improvement having been brought about by a natural process through the agency of climatic changes.

After the sea had maintained its supremacy for ages, the tides and currents began to perform their work. Then the tiny animal began to sport on the shimmering waves, and as they died formed animal mold to be washed together, and the little coral insects rearing their homes, formed reefs on which the waste matter lodged, until islands were formed, and finally continents began to appear. The animal mold by being mixed with the disintegrated rock formed soil, and at last a flower here and there, and then little shrubs, and finally great forests adorned the surface of the planet.

Then in process of development, little bees began to hum and sip the sweet nectar from the sweet scented wild flowers, and the chirp of the little bird and the song of the nightingale made the vast sylvan solitude redolent with the sweet notes of joy. Then in the vast natural procession came the animals, one after another, each in its proper place, and at the rear of all this natural pageant we see a being called man who is simply a result of climatic changes, animal development and natural adaption. Of course man of to-day does not occupy the extreme rear of creation, for *there will be a higher animal than yet exists*, which will be simply a development over previous organisms. The superfluous organs will be discarded, and the future being will be fitted to enjoy his situation of superiority, throughout the ages which shall elapse during his reign of a cycle of the boundless time of eternity.

When we see the dew upon the verdure and hear the patter of the rain drops, and see the spring gushing out of the rocks, and the merry rill go murmuring along, and the roaring cataract in the mountains, and the mighty river coursing its way to the sea, and see the steam issuing from the ponderous engine, we can reflect on nature, for her ways have been ways of grandeur and sublimity.

The water which now enlivens our industrious machinery and beautifies our land, has had an eventful and varied existence, and has been one of the most ponderous agents in the performance of nature's great ultimate purpose.

CASTLETON, IND., July 18, 1883.

Economy and Speed in Railway Service.

THE address of Mr. Percy G. B. Westmacott, as reported in *Engineering* of July 27, 1883, is too long for reproduction in these columns, but what he had to say about railway matters is highly interesting and instructive, and we are glad to quote, as follows:

"It is surprising how soon the speed of the locomotive was brought up to something approaching its present limit. George Stephenson was laughed at in 1825 for maintaining that trains would be drawn by a locomotive at twelve miles an hour, but the Rocket herself attained a speed of twenty-nine miles an hour at the Rainhill competition in 1829, and long afterwards ran four miles in four and one-half minutes. In 1834 the average speed of trains on the Liverpool and Manchester Railway was twenty miles an hour; in 1838 it was twenty-five miles an hour. But by 1840 there were engines on the Great Westerd Railway capable of running fifty miles an hour with a train, and eighty miles an hour without. In 1841 we find Stephenson himself ranged on the side of caution, and suggesting that forty miles an hour should be the highest regular speed for trains. Now, it is a remarkable fact that the highest speed at which locomotives run in ordinary practice, scarcely seems to have been raised during the last twenty-five years; on the other hand, the weight of the trains has been perhaps doubled. Although the average running time of express trains has in many cases been improved, this has been almost entirely due to their making fewer stoppages. At the same time the speed occasionally attained is very great. Engines on some of our principal lines have repeatedly run fifteen miles in twelve minutes, or at a speed of seventy-five miles an hour, and express trains run regularly at fifty-three miles an hour. It does not follow, however, that there is never to be any increase in the speed of trains, and it seems a point well worth consideration in what way the time of transit between important centers of trade can be shortened.

What are the causes which have tended to prevent any improvement in this particular? In the first place, it may be said that the permanent way would suffer seriously by further increase in speed; but this could surely be overcome in time by improving the permanent way itself, which also remains very much in the same condition and of the same construction as it was twenty-five years ago. Again, it may be said that the running at a higher speed would require more powerful engines, and hence that trains now worked by a single engine would require two, or would have to be split up into two trains at a great increase in running expenses. This, however, assumes that it is not possible so to improve the engine that it shall be able to exert a considerably higher power without an inadmissible increase in weight. By utilizing a larger part of the total weight of the engine as adhesion weight, it would be easy to obtain the amount of adhesion required for the increased tractive force; and for this purpose Mr. Webb's compound locomotive, which enables the number of driving-wheels to be increased without the use of coupling rods, appears to merit particular attention.

Another point in which improvement may possibly arise in the future should be noticed. On the Russian railways, where both coal and wood are dear, the burning of petroleum has now taken a practical form. Our member, Mr. Thomas Urquhart, has been very successful in this

direction, and is now running locomotives regularly which use only petroleum refuse, and which show a marked economy over coal or wood. To test the point, he prepared three locomotives of exactly the same type, and started them on successive days under exactly similar conditions of weather, train, and section of road. The trips were made both ways, and the results per verst, including fuel required in lighting up, were as follows:

	copecks.
Anthracite, 52.9 Russian pounds, cost	26.35
Wood, 0.0107 cubic sashin, cost	23.54
Petroleum refuse, 27.36 Russian pounds, cost	11.64

There is thus in this instance an economy of at least fifty per cent. on the side of petroleum, the boiler pressure being from 120 pounds to 130 pounds, and the gross load over 400 tons. At the same time the weight of fuel used, as against coal, is diminished by about fifty per cent., which is a most important item."

The Railway Field in Mexico.

UNDER the above title a writer for the Pennsylvania *Ledger* has published a well-informed article, from which we give a few of the principal facts:

The comprehensive national railroad system of Mexico, as originally planned by her political leaders—and planned before they granted out the several concessions—may be roughly outlined as follows: Three transcontinental or east and west trunk lines, with two north and south trunk lines. This for the country northward of the city of Mexico, which is the bulk of the republic. For the rich triangle southward from the city of Mexico to Guatemala a little system of its own was laid out, giving it outlet to Atlantic and Pacific ports and down the Isthmus, to connect in time with the South American system.

The three transcontinental trunk lines above mentioned belt the republic successively from Tampico to Mazatlan; from Tuxpan to San Blas; from Vera Cruz to Manzanillo. The southern system provides for a fourth and more southerly transcontinental route, namely, from the city of Mexico west to Acapulco. The north and south trunk lines strike out from the city of Mexico to reach respectively El Paso, in the territory of New Mexico, and Laredo, in Texas, at which points they enter the United States and connect with our systems. To this system was added afterwards another line, from Laredo to the city of Mexico, running nearer the coast and along a lower bench; the Huntingdon line, which runs from Eagle Pass to Durango—swinging thence by a curve across to the city of Mexico; the Topolobamba line from Eagle Pass to Topolobamba; and a number of branches, including an important subsidiary north and south line from Guaymas directly northward to the United States. This plan gives every State in Mexico, except the two small and remote States of Campeche and Tabasco, one or more lines, and one direct railway communication with the capital.

When the several sections of this system were let out to foreign *concessionaires*, the north and south line from El Paso to the city of Mexico, with the transcontinental line from Tampico to Mazatlan, fell to the Central Company, organized in Boston; the north and south line, from Laredo to the city of Mexico, with the transcontinental line from Vera Cruz to Manzanillo, fell to the National Company, organized in New York, but with Philadelphia conspicuously represented in its management and capital. The transcontinental line to be built by this company runs out from the city of Mexico to Manzanillo; the section from the city of Mexico to Vera Cruz having been already built by an English company. Both of these companies—the Central and National—have made rapid and substantial progress in carrying out their contracts with the Government. They both accepted their concessions in September, 1881, began work on the ground in October of the same year, and have now between them some 1,600 miles of road constructed. Together they have put into the work probably over $60,000,000 in gold.

The whole railway mileage of Mexico is 2,779, of which 932 are three-foot guage. The Central and National are each laying track continuously from four or more points, and there is a fair possibility that both of them may have through routes to the city of Mexico, by the end of 1884. In May of this year the concessions of the Lower Bench Laredo line, and of the Mexican Southern Company were consolidated in a new concession, and General Grant was elected president of the united system. Under the terms of the new concession, work of construction had to begin by July 14th, and work was so begun. The railway field of Mexico is simply an extension of the railway system of the United States. Mexican railroad tables appear now every month, without a word to indicate, unless it is suggested by the title, whether the railways are in Mexico or in the United States of America.

Things Worth Knowing.

BY F. B. GARDNER.

THERE are but few who do not fully appreciate the value of information regarding any trade or profession closely allied to the one they themselves follow. And who, let me ask, is more anxious to know the ins and outs of the painting of railway cars than he who, superintends their construction, providing, of course, that he is not a painter? He may have faith in his foreman painter, and also have a close eye upon the workmen himself, yet he must be more intimately acquainted with details in the work than that, in order to conscientiously perform his duty. In our experience of over thirty years we have frequently been approached by persons holding good positions in car shops, inquiring what opinion we held regarding certain things connected with painting railway cars, such as:—Were light colors or dark colors best? Was it the correct thing to apply two or more coats of finishing varnish to the outside of a car instead of applying more paint, or undercoats of varnish? Would gold wear better if put on dead color than if put over varnish or color-and-varnish? Was the varnish used on the outside of cars as suitable for locomotives, or was there something better for these machines where heat and smoke, dust and oil were the destroying agents? Should oil as coming from the waste used in cleaning the metal parts be wiped over the painted and varnished work? and a hundred and one such questions which, it seemed to them, were of vital importance in their every-day experience, but which they were unable to study out, and yet disliked to show any lack of knowledge of to those higher in power than themselves, or to lower their standard with those below them by inquiring about things which they believed they ought to know.

The exact answers made by me at that time I am now unable to repeat, but it is my intention to give my views on several of the various questions, having been assured that they were yet of interest to all concerned in railroads. There was quite a lengthy discussion in the trade journals some time ago, regarding light and dark colors on cars, and I was fortunate enough to secure quite a number of the articles that then appeared, but was unfortunate enough to lose all that valuable data in the fire which destroyed this magazine; therefore I must be brief in this article, as I have not time to work out the subject as it was then done. I repeat the assertion that there is no reason why dark colors should not be as durable as light colors, if the work be properly done.

Much has been said and written in regard to white lead, used either as a priming or as color, and the omnibus or stage builder and the carriage builder well knows how difficult it is to make a white job to stand. A white hearse, for example, will go to ruin in a short time, while the black one standing beside it will last several years.

The foundation coats for a light color must be of a different color and nature from those on which a dark color is to be put, and that has something to do with the more speedy decay of light colors than of dark ones. It requires several coats of a light color to cover solidly, while in some cases *one thin coat* of a dark color will suffice; and every painter will concede the fact that the thinner the coat of paint, to make the work smooth and well covered, the better it will wear. The "Pullman color," as it is called, is a dark maroon or brown, and it stands well. The elevated roads in New York City have discarded the light green for the dark red and olive. And in answer to the question, "Which is better, the light or the dark," I should invariably say, *the dark*. In regard to the varnishing of cars by what is called the "repeating process," *i. e.*, the application of two or more coats of finishing varnish, at intervals of from twenty-four to thirty-six hours between each, is one of those questions which, like politics, calls out two or more sides or different beliefs. Mr. A. P. Sweet, at the Master Car Painters' convention, read a paper in which he favored the repeating process, and there were many in the audience who agreed with him, and said it was their practice, while some derided the idea; and now, as it has become a feature of some considerable importance, I am inclined to await further developments by writers to this or other like papers; but I certainly endorse the plan of putting on two coats of railway finishing instead of two or more coats of rubbing varnish. One reason is, that there is a *thicker* coating of paint and varnish—which is hard and brittle, perhaps,—when so many rubbing coats are applied, and a *thinner* coating of paint and varnish when two coats of finishing are put on, and not that liability to chipping, etc., the thin coating being more elastic. Remember the rule! "The less paint and varnish to make the surface all right, the better."

It has been tested and proven in many cases by the leading wagon makers of New York and vicinity, that gold put on over *dead color* will outwear that put on over color-and-varnish by one-half, though there are few who practice it, owing to the dislike of their workmen to do so. The size does not flow from the pencil as nicely, and their color must be finer than otherwise, else the gold would show the grain. There are many things in painting we may know to be good, but being inconvenient we pass them by.

The varnish for cars is called "Railway Coach Finishing," while that for locomotives is called "Locomotive Finishing." The latter is made expressly to fill a want, discovered by the varnish manufacturers after many years of study, and is the best where heat, dust, etc., are at all times endeavoring to destroy it, but it would not be so durable on the outside of cars.

The oil from the engineer's waste is certainly beneficial to a certain extent, but he should wipe the varnish as dry as possible. The oil goes to feed the varnish on the heated machine, and being absorbed, gives elasticity where none would be in a certain length of time, if this was not done. This may be seen on locomotives that are being continually wiped over by a tidy engineer or fireman. While on the other hand, a slovenly or lazy engineer and fireman will soon have a dingy-looking locomotive.

Having run rapidly through the questions, I intend to follow this paper with items of a similar character, and in doing this I shall be pleased to have assistance from any brother of the brush who feels disposed to tell of things worth knowing.

Railroad Gardening.

The traveler in England finds that the railroad stations, however small, are in marked contrast with similar stations in this country. Instead of the usually desolate appearance, often increased by accumulations of old ties and other railroad rubbish, seen at home, the grounds surrounding the station house are laid out and kept with all the care given to a private garden. So excellent an example has extended to this country, and one of the railroads running south from Philadelphia has for some years employed an experienced gardener to superintend the planting and care of the grounds around its numerous depots. The present season, the grounds surrounding the signal houses, on both sides of the Bergen Tunnel, have been put in order, and large ornamental beds planted. These beds are in the "fire-works" style, but we are not disposed to criticise so long as something is done to relieve the former desolate appearance. It would be vastly better for each road to employ a competent person to lay out and plant the grounds around its stations than to leave this to the fancy of the station-masters. So far as we have observed, when the plantings are thus left, efforts are directed entirely to immediate effect. Areas are devoted to the usual bedding plants, but no provision is made for the future. A competent superintendent, while he would not neglect the bedding-plants, would set out ornamental trees, flowering shrubs and hardy perennial plants. With these the surroundings of the stations would increase in beauty from year to year, and with a proper selection of hardy perennials, the need of an annual renewal of bedding-plants becomes thereby greatly reduced.

Another matter, much regarded in Europe, but little considered in this country, where it is much more necessary, is the planting of climbers around station buildings. The passing traveler has but a few minutes, at most, to notice such improvements, and nothing is more striking than to see the buildings draped with climbing vines. Besides beautifying the surroundings of the stations, in some parts of France and Germany, the sides of the rail-

way embankments have been turned to account by devoting them to the the cultivation of fruit trees of various kinds. The embankments on some of the roads in this country present a large area, which in time will produce something—usually a crop of weeds. If the embankments are not suited to fruit culture, they may generally be made useful by sowing them to grass; which, besides keeping down the weeds, would render good service in binding the soil and preventing sudden "washouts." Some years ago the traveler over one of our Middle State roads must have noticed the vegetable patches attached to the cabins of the road tenders. These were often examples of excellent culture, and served to show how the wasted land along the roads might be utilized. Land will not always be so cheap in this country as it is at present, and our railroad companies will find it to their interest to utilize a vast area that now goes entirely to waste, by planting trees and shrubs.—*American Agriculturist.*

POOR'S RAILWAY MANUAL, just issued, says that the railroad mileage at the close of 1882 was 113,329 miles, 11,591 having been constructed during the year. The average mileage operated for the year was 107,158. The amount of share capital issued by the several companies up to the close of their respective fiscal years was $3,456,078,196, an increase from the previous year of $385,254,585. The funded debts of the several companies amounted to $3,184,415,201, an increase from the previous year of $352,554,496. Their floating or unfunded debts amounted to $255,170,962, an increase of $42,404,965. The total increase of share capital and of funded and floating debts from the previous year equaled $780,213,776. The total amount of all liabilities at the close of 1882 was $6,895,664,359. The total per mile for completed mileage was $61,342. The total of stock and liabilities for 1881 was $6,115,540,583; the amount per mile, $57,730. The total for 1880 was $5,373,015,928; per mile, $58,949. The total for 1879 was $6,872,017,517; per mile, $57,730. Gross earnings of all the roads for their several fiscal years of 1882 were $770,356,716, an increase from the previous year of $67,066,511.

SPIKES.

PRESIDENT JEWETT passed through Port Jervis the other day, and the Erie employés at that place had a good opportunity to see him. "And so that is the president of our road," said a witty flagman. "Well, I'm blowed if I wouldn't like to exchange jobs with him, and do the work for the same pay. You see, I could do his work, because I could obtain lots of talent to help me; but I doubt very much if he could or would run back half a mile over a slippery track, with the thermometer down to twenty degrees below freezing, to save a rear collision. Talent, you see, runs in different directions; mine is in my legs, and Jewett's is in his head. That's all the difference between him and me."

"PORTER, wake me at Harrisburg," and the passenger in the chair car dropped half a dollar into the colored man's hand. At Altoona the porter shook the passenger and said: "Boss, we's jes' half way to Harrisburg now." "Well, what are you waking me for?" "You see, you done gimme half a dollah, sah, an' dat's twice as much as mos' men gimme, so I thought I'd gib you two wakin's fur it, one hyar and one at Harrisburg."—*Every Evening.*

"That fellow had a monstrous foot, the biggest I ever saw." "How large?" asked the general. "Give us some idea of its size?" "I don't know that I can, but I will tell you what's a fact. His foot was so big that—well, you have heard the old story of the fellow who used the forks of the road for a bootjack? Yes; well, Nick tried it, and split the road so far that the geography of the neighborhood was changed."

TWO girls while walking out the other day came to a ditch near the railroad grade which they did not know how to get over. Seeing a young man coming along the road they appealed to him for help, whereupon he pointed behind them with a startled air and yelled out "Snakes!" The way those girls crossed that ditch was a sight to behold.

"I'm railroading now," said a young man as he shook hands with a friend in the Globe Hotel recently. "I occupy the position of second conductor." "What is the difference between first and second conductor?" was the query. "Why, you see, the first conductor starts the train, and the second one stops it."

A COLLECTOR once wrote to General Sherman for his autograph and a lock of his hair, and he answered by letter," "The man who has been writing my autographs has been discharged, and as my orderly is bald, I cannot comply with either of your requests."

THE principal of an inland temple of learning saw fit to expel one of his boys, who then wrote home to his father in justification of his course: "I got expelled for riding with the girls, but I took the neatest, cleanest, prettiest girl there was in town."

THERE is a story going the rounds of the papers of a little girl who was about to put a penny in the missionary box, and being requested to repeat a verse of Scripture while dropping her gift, said: "Fools and their money are soon parted."

"HUSH! Beware of the torpedo!" said a young lady to an ineligible admirer, who was becoming too attentive. On his asking for an explanation, she answered: "Oh, its only our new name for mamma, because she blows us up so!"

THE cost of stopping a train of cars is said to be from 40 to 60 cents. But it wouldn't do any good to hold up half a dollar to the brakeman on the rear end of a train you have missed, as it goes out of the depot.—*Lowell Citizen.*

A SUBSCRIBER to a southwestern newspaper died recently, leaving four years' subscription unpaid. The editor appeared at the grave and deposited in the coffin a palm leaf fan, a linen coat, and a thermometer.

MRS. HOMESPUN, who has a terrible time every morning to get her young brood out of their beds, says she cannot understand why children are called the rising generation.—*Boston Transcript.*

A MAN writes to an editor for $4 "because he is so terribly short," and gets in reply the heartless response. "Do as I do; stand upon a chair."

THE latest cigar is named "The Mother-in-law." You set it on fire with a match, the same old way.

Financial.

THE writing of a financial article has become rather a tame and monotonous affair. There are no startling changes to record, and the stock market resembles more than anything else, the old see-saw plank on which we used to play when boys. When stocks begin to go down then the operators begin selling short as long as they dare, when they turn round and buy to cover, and stocks rise in consequence. When they have covered, the market becomes dull again until some one inaugurates a bull movement. It is safe to state, however, that the operations on Wall street have very little effect on the outside public. The rank dishonesty that has marked dealing in stocks, in which brokers and those inside the ring fleeced the public, has seemingly brought the result of driving the public away from speculation, thus leaving the brokers with only each other to fleece. The latest ripple on the financial sea was the defaulting of the Ohio Central Railroad on its River Division first mortgage bonds. The *Chronicle* thus gives the history of this road:

"The active existence of the company may be said to date from the 1st of January, 1880. The prospectus issued at that time presented things in a very pleasant way. The road was to become a prominent carrier of bituminous coal in Ohio, and particular stress was laid on the fact that the Columbus and Hocking Valley, and Columbus and Toledo roads, having 230 miles, had together paid 7 per cent. on 5½ millions bonds and 8 per cent. on 3 millions stocks in the year immediately preceding. Of course, the new enterprise, starting in such auspicious times as then prevailed must outdo the old rival in some way, in order to be better prepared to share with it the business; so instead of 5½ millions bonds, as on the Hocking Valley roads, the Ohio Central was given 6 millions, (3 millions first mortgage bonds and 3 millions income,) and instead of 3 millions stock it was given 4 millions. This worked so well, apparently, that it was concluded to try operations on a larger scale. The road having been built for the coal business, the coal lands furnishing that business had to be secured, and the Ohio Central Coal Company, owned and controlled in the same interest as the Railroad, offered a convenient means of obtaining them. Accordingly, the two companies were merged into one in January, 1881, and the capital of the Ohio Central Railroad inreased from 4 to 12 millions. Previously the railroad had also provided itself with a terminal mortgage for $600,000, in keeping with the spirit of the times. But as yet the line ran merely from Toledo to Hadley Junction and Columbus;—it must go on to the Ohio River and into West Virginia. The Mineral Division, having $300,000 1st mortgage bonds and $300,000 income, supplied the initiative in this direction, but soon gave place to the more ambitious "River" Division of 150 miles, from Corning, Ohio, to Charleston, W. Va., lately completed, with its $7,000,000 1st mortgage, $4,000,000 incomes, and 10 millions stock. It is on the mortgage bonds of this division that default is now to be made. Three millions of these bonds are meant to retire $2,550,000 Ohio Central Company bonds and also the $600,000 Mineral Division bonds, but the total amount is as stated, and includes the bridge across the Ohio. That modern contrivance, however—the car trust—has also found lodgment in the bosom of the concern, for we see that there are trust certificates No. 1 to amount of $360,000, and car trust certificates No. 2 to amount of $1,750,500, together $2,110,500, both bearing interest at the moderate rate of 8 per cent. per annum. Thus there is now 22 millions of stock, 10 millions of 1st mortgage bonds, $600,000 terminal bonds, $2,100,000 car trusts, and 7 millions of incomes—all on a road of less than 400 miles.

Some people are unkind enough to present this as a fair sample of railroad properties in general, which cannot be the case, as some of our most badly watered stocks have done well by their stockholders.

The New York Central and Harlem River Railroad issued watered stock in 1867 and 1868 to the tune of $47,000,000, on which they have been enabled to pay 8 per cent. dividend annually, which for the 13 years intervening amounts to $52,640,000, independent of interest. Add the interest to these annual dividends, and holders of this watered stock will have received in 13 years over $80,000,000, or nearly twice as much as the face value, and still have the stock left on which to receive more dividends in the future.

The following corporations of New York State have reported to the State Comptroller at Albany, the amounts of their earnings within the State of New York for the year ending June 30, 1883, as follows:

Companies.	Gross earnings.	Tax levied.
New York Central	$28,929,444 72	$144,647 22
Boston and Albany	1,069,412 48	5,347 06
Utica and Black River	815,472 11	4,077 36
New York Central Sleeping Car	405,381 87	2,026 90
Delaware, Lackawanna and Western, lessees U. C. and B. and R. and C. roads	146,485 44	734 42
New York and Harlem	670,950 26	3,354 75
Delaware, Lackawanna and W. as lessees	3,160,032 18	15,800 16
Lake Shore	1,021,401 75	5,107 00
Southern Central	508,480 14	2,042 40
Boston, Hoosac Tunnel and Western	319,520 67	1,597 60
Manhattan	6,245,589 70	31,227 94
Buffalo, Pittsburgh and Western	511,493 51	2,557 49
Syracuse, Chen. and New York	94,234 34	471 17
Syracuse, Bing. and New York	1,019,603 59	5,098 81
Sodus Bay and Southern	47,001 99	235 01
Newburg, Dutch. and Conn	149,828 30	749 14
Elmira State Line	55,638 45	278 29
Elmira, Jefferson and Canandaigua	375,749 04	1,878 74
Elmira and Williamsport	77,517 95	387 54
Chemung	202,404 42	1,012 02
Genesee Valley Canal	7,811 80	39 06
Olean, Brad. and Warren	60,571 91	.....
Greenwich and Johnsonville	33,972 84	169 86
Adams Express Company	11,738 11	58 69
Albany Railway	132,827 99	664 14
New York, Chicago and St. Louis	134,989 45	674 95

There is no question but that there is an abundance of money, because it is so readily obtained at a very low rate of interest on call when the security is first-class. Still parties wishing to borrow on 90 days are willing to pay as high as 6 per cent., and find hard work to negotiate even at this rate. The reason for this condition is to be ascribed to the timidity of capitalists who are apparently waiting, feeling that the unexpected is always liable to occur. They prefer to take a very low rate of interest with undoubted collateral as security, than have the unexpected suddenly come upon them, and they not in a condition to meet it. The capitalists seem to be justified in taking this position when we look at the commercial world, which in the two large auction sales of dry goods aggregating some $3,000,000, gives evidence that there has been a great over-production in this country.

In reviewing the whole situation as carefully as we can, while not claiming to be prophets, we can advise our readers that money invested at 4 per cent. is safer than if placed on securities paying a higher rate.

TRADE NOTES.

THE railway velocipede made by the Kalamazoo Railroad Velocipede Company, of Kalamazoo, Michigan, having a driving wheel on each track, is equally balanced by the weight of the operators and cannot be accidentally upset; it is propelled by the hands and feet and may easily be operated by either one or two men, the motion being the same as in rowing. No matter at what speed it may be driven, there is no danger whatever in making curves, and, being provided with a brake conveniently located, the car can be readily stopped in a distance of eight or ten feet. The axle revolves under friction rollers four inches in diameter, whereby the amount of friction is greatly lessened and the car is consequently propelled with much greater ease. This is a feature peculiar to the velocipede under description. A speed of twenty-five miles an hour has been made on these velocipedes, although a rate of from fifteen to twenty miles per hour is all that is claimed. In their construction, the utmost care is exercised to secure strength and durability. The axle is cast steel, wrought-iron truss, and one inch trailing-bar; there is no wearing of wood, no getting loose and rickety, and no worming around of seat on uneven tracks.

The Pittsburgh *Commercial Gazette* says: A new process is in course of introduction at the Edgar Thomson Steel Works which will materially lessen the cost of producing steel rails. Last January the method of blowing the metal as it came from the furnace, instead of putting into pigs and remelting, was put into practice, and to this is to be added the soaking pits. In these the ingots, as soon as they are cool enough to leave the mould, are placed, and by the heat held within them they are brought to a uniform degree of heat, and rails are made with one heating of the metal. This method has been successfully used in England, and will be used here in the course of six weeks or two months. The saving will be from $1.50 to $1.75 per ton. Some of the Western papers place the figure at $5, but they are away out in their reckoning.

THE United States Mineral Wool Company, New York, has received, during May and June last, orders for 261,000 pounds of ordinary mineral wool to be used in passenger cars. Thirty thousand pounds were ordered by the Ontario Car Company, of London, Ontario; 10,000 pounds by J. G. Brill & Co., of Philadelphia; 24,000 pounds by the Chicago and Northwestern, and 27,000 pounds by the Gilbert Car Manufacturing Company, of Troy, New York; while three separate orders, for 10,000, 40,000, and 120,000 pounds respectively were received from the Pennsylvania Railroad Company.

THE Union Switch and Signal Company of Pittsburgh, Pa., manufacturers of railroad signaling appliances of all descriptions, frogs, crossings, switches and switch-stands, have recently published three pamphlet catalogues of their goods. These catalogues are masterpieces of the printer's art, being printed on heavy paper, illustrated with numerous cuts and plates, and form on the whole the most expensive trade list we have ever seen. The intrinsic value of these magnificent publications will insure their permanent preservation by all who have the good fortune to receive them.

THE Schenectady Locomotive Works are completing orders for 25 freight engines, 17 x 24-inch cylinders, for the Chicago and Alton; four consolidation engines, 20 x 24-inch cylinders, for the Kentucky Central road; eight passenger engines, weighing 45 tons each, with 18 x 24-inch cylinders, for the Canada Southern Division of the Michigan Central. They have lately taken orders for seven Mogul freight engines, with 19 x 24-inch cylinders, for the Lake Shore and Michigan Southern, and 45 freight engines, with 17 x 24-inch cylinders, for the Chicago and Northwestern.

THE car works and car wheel companies of Knoxville, Tenn., were recently awarded the contract for furnishing the East Tennessee, Virginia and Georgia Railroad with 500 standard box cars. The contract, including the castings, will aggregate $250,000, which is a handsome sum to keep at home and distribute among the Knoxville mechanics. Knoxville is only one of many Southern cities now coming to the front as manufacturing centers.

E. Y. BELL, proprietor of the Patent of "Bell's Ventilator for railway closets," heretofore referred to in the JOURNAL, has granted licenses for use of the closets on the Pennsylvania R. R., the Northern Pacific, the New York, Lake Erie and Western, and the Oregon Railway and Navigation Co. Mr. Bell is now in negotiation with the West Shore and also the Union Pacific, for its adoption.

WORKMEN of the Jackson & Sharp Company are finishing one of the finest pieces of workmanship ever turned out of the shops of that firm—the palace hotel car Edwin Forrest, built for the Worcester Excursion Car Company, of Worcester, Mass. The car is the fourth one of the kind constructed for the company, and is complete in even the minutest details.

THE Pennsylvania Schuylkill Valley Railroad has contracted with Coffrode & Saylor, of Pottstown, for seven iron plate girder bridges to be used on their line. The contract is a very large one. The Manayunk Bridge contract will be let on Wednesday and the Phœnixville within a few weeks.

CHAS. W. PICKERING & CO., of Philadelphia, manufacturers of railway springs, have opened a branch office in Room 45, Boreel Building, 115 Broadway, New York, under the management of A. L. Rowe.

THE Harrisburg, Penn., Car Manufacturing Company are building twenty of the Burton improved stock cars for the Burton Stock Car Company, of Boston, Mass.

THE New York and New England has received three splendid passenger coaches from J. G. Brill & Co., Philadelphia, and seven more will soon arrive.

THE Baltimore Locomotive Works are building ten locomotives per week. These works are employing 2,800 men.

THE Fullerton Car Works are working on a 100 car order for the Toledo and Indianapolis Railroad.

LITERARY NOTES.

THE Preliminary Report on the Foreign Commerce of the United States during the fiscal year ending June 30, 1883, shows the total value of the imports and exports of merchandise during the year to have been $1,546,928,485, being larger than during any previous year in the history of the country. The value of exports exceeded that of imports $100,683,153. Mr. Joseph Nimmo, Jr., compiler of

this little pamphlet, shows in its compilation as indeed in all his work as chief of the bureau of statistics, his eminent fitness for the position. The Preliminary Report is issued from the Government printing office, Washington.

NATIONAL pride in the appearance of American trade Journals finds gratification in the examination of *The American Artisan, Times and House Furnisher*, a monthly, published in Chicago, of whieh the number for September lies before us. We are much pleased to record that our contemporary is replete with evidences of prosperity, its reading matter and reports being organized and comprehensive, elegantly printed and illustrated, and accompanied with advertisements scarcely less valuable to the discriminating reader, because presenting, by means of both pictures and letter press, a faithful showing of the stage of development which the various interests represented have so far reached.

Dio Lewis's Monthly is not as lame as it looks, but tedious enough, though it contains some reading at once light and instructive, and is printed in luxurious old-style type, on paper with a "dead" surface. The trouble with this new magazine is, that it is too Dio Lewis-y. Most conspicuously, the name of the great man appears at the head of every page, announcements of his benevolent business enterprises are the chief feature of the space devoted to advertising, and cuts and letter-press throughout, alike remind the reader of the great apostle of farinaceous food. *Dio Lewis's Monthly* gives one mental indigestion.

WE can spare just one line in commendation of the Souvenir edition of the Eleventh Cincinnati Industrial Exposition, 1883, issued by the enterprising publishers of the *Baltimore Manufacturers' Record*. This number appears in special form, being arranged in a gorgeous colored wrapper, presenting two views of the Exposition Building, and a pictorial allegory of a pleasing character. The first article contains an account of Cincinnati and her Expositions, the next of which, by the way, will last from September 5th to October 6th.

THE September *St. Nicholas*, both in its pictures and reading matter, most assuredly answers the requirements of the most exacting boys and girls. It contains good reading for children of all ages, from little tot to the big brother who begins to speak in a gruff voice. The best of the illustrations are all that can be desired by the critical.

CARE OF SICK OR INJURED EMPLOYES.—A system has recently been established by the Denver and Rio Grande Company by which every employé shall receive care and treatment for injuries received, or sickness contracted while in the service of that company. Local physicians and surgeons have been appointed at stations at equal distances apart, and the entire system of treatment is under the care and supervision of one general surgeon at Denver. A "conductor's emergency chest" is furnished each train, containing suitable remedies and instructions applicable to the various accidents liable to happen. Hospital accommodations are provided at five different points along the line, where patients will be cared for if they have no suitable home to go to. For the maintenance of this system and to meet the expenses connected therewith, an assessment of fifty cents is made monthly, and deducted from the wages of each employé at the time of drawing his pay. If the employé works less than half a month, only twenty-five cents per month is deducted; if over half a month, the full amount. Medicine supply stores are also stationed along the line.

WEALTH OF THE CHICAGO AND NORTHWESTERN.—This road has $39,175,720 in stock and $69,821,000 in funded debt, most of which is at 7 per cent. In undistributed assets and stock it has, says the Financial Chronicle, Unissued stock owned by company since May 31, $622,615; exchanged since for Elgin and State Line and Chicago, Milwaukee and Northwestern stock, $9,765,100; stocks of other proprietary roads held, $12,692,500; land income balance, $1,033,565; surplus income account, $8,425,862; total, $32,539,642. Here we have a total of undivided assets and surplus in the large sum of $32,500,000. Should the company determine to distribute it all, which of course is not likely, in the shape of a stock dividend, stockholders would be entitled to an increase of 84 per cent. in their holdings. Even leaving out the surplus income and the land balance, and supposing all the proprietary road stock exchanged, there would be full 23 millions of unissued stock at the disposal of the Chicago and Northwestern company.

THE official statement of the business of all lines of the Pennsylvania Railroad Company east of Pittsburgh and Erie for July, 1883, as compared with the same month in 1882, showed a decrease in gross earnings of $18,200, an increase in expenses of $136,159, and a decrease in net earnings of $154,359. The seven months of 1883, as compared with the same period of 1882, show an increase in gross earnings of $1,683,533, an increase in expenses of $1,509,188; an increase in net earnings of $174,345. All lines west of Pittsburgh and Erie for the seven months of 1883 show a surplus over all liabilities of $309,690, being a decrease as compared with the same period of 1882 of $45,340. The statement that the Philadelphia and Reading Railroad Company have defaulted upon certain payments is declared at the office of the company to be untrue.

PRESIDENT ARTHUR has appointed D. D. S. Brown, of Scottsville, N. Y., George G. Wright, of Des Moines, Iowa, and William S. Furay, of Columbus, Ohio, as a commission to examine and report upon seventy-five miles of the Northern Pacific Railroad in Montana. To examine forty-two miles of the railroad in Oregon and Washington Territory the following named commissioners have been appointed: William H. Beard, of Brooklyn, Richard M. Galloway, of New York City, and Alonzo Bell, of New York.

FASTEST TIME YET IN CANADA.—Readers will remember that a few weeks since the Canadian Pacific Railway advertised to run an express train between Montreal and Ottawa, a distance of 120 miles, in two hours and fifty-five minutes. The Canada Atlantic, a competing line running in conjunction with the Grand Trunk, not to be outdone, advertised to make the run in two hours and twenty-nine minutes, and this has been carried into effect. This is the fastest time made over any Canadian road.

Tramway.

THIS department of the AMERICAN RAILROAD JOURNAL is devoted to the interests of Street Railways; and communications, suggestions and items of information relative to their organization, management and appliances are solicited by the editors. All communications should be accompanied by the name and address of the writer. The English nomenclature of "Tramway" is adopted in this department as being of greater convenience and more specific in its meaning than "street railway," though in allusion to individual organizations we shall preserve their corporate titles. It is our hope to nationalize the term Tramway, which is now generally used in every English-speaking territory with the exception of the United States.

THE experiment we are making in keeping up a department devoted to the interests of street railroads is attended with mixed results, to moralize for just once, like about everything else one tries in this "working-day world." Letters received having reference to tramway matters speak appreciatively of that unique feature of the AMERICAN RAILROAD JOURNAL wherein they are treated; but, perhaps, a number approaching majority of the communications on the subject find fault with some little thing or other in the management of said feature. In short, our experience in the matter is one with the great majority of editors, first in the knowledge that it is impossible to edit a journal so as to please all readers; and, secondly, that persons in the community who think they can do the job much better than it is done, are quite respectably numerous. Nothwithstanding this fact, which is after all one to be thankful for rather than to grieve over, we cannot do otherwise than to persevere on the same general plan, which has hitherto proved successful. In its pursuance we have profited by the suggestions of correspondents as well as by the receipt of valuable information forwarded us by them; and write this paragraph chiefly for the purpose of assuring all people who have anything to say on the subject of street railroads, why we should be pleased to receive a letter from them, and that every communication received at this office is carefully considered, and dealt with in the manner which, after just and impartial consideration, seems to be right.

Street Railway Association—Convention of Representatives.

THE regular annual meeting of the American Street Railway Association will be held at the Grand Pacific Hotel in Chicago, Ill., the second Tuesday in October, (the 9th), 1883, at ten o'clock, A. M. Papers will be read and discussed on the following important subjects, viz.: "Construction of Track;" "Propelling Power;" "Buildings;" "Labor and Wages;" Collection of Fares;" "Removing Snow and Ice;" "Horseshoeing;" and "Heating and Lighting." The Association will be in session for at least two days, and the gathering of the representative street railway men of the United States and the Canadas is expected to be very large; with delegations also from Europe.

The Association has now a membership of thirty-nine companies, representing sixteen of the United States and the Dominion of Canada. The officers of the Association are: President, H. H. Little, general manager Louisville City Railway Co., Louisville, Ky.; Vice-Presidents, Wm. H. Hazzard, president Brooklyn City Railroad Co., Brooklyn, N. Y., C. A. Richards, president Metropolitan Railroad Co., Boston, Mass., Geo. B. Kerper, president The Mt. Adams and Eden Park Inc. Railway, Cincinnati, O.; Secretary and Treasurer, W. J. Richardson, secretary The Atlantic Avenue Railway Co., Brooklyn, N. Y. Executive Committee: President, Vice-Presidents and Julius S. Walsh, president Citizen's Railway Co., St. Louis, Mo., Chas. Clenshaw, vice-president Troy and Lansingburgh Railroad Co., Troy, N. Y., Thomas Lowry, president Minneapolis Street Railway Co., Minneapolis, Minn., James C. Lake, superintendent Chicago West Division Railway, Chicago, Ill., D. F. Longstreet, general manager Union Railroad Co., Providence, R. I.

The AMERICAN RAILROAD JOURNAL will have its representatives at the Convention, and report in the October issue such details of proceedings as may be likely to interest readers of the "Tramway Department."

Motive Power on Tramways.—A Veteran's Opinion.

"My observations during fifty years, force me to the conclusion that the question as to the best methods of motive power on tramway roads is not settled against the use of horses; in fact, that the period of successful or profitable substitution of other motive power is further off than ever." The utterance quoted above was addressed to a JOURNAL representative by JOHN STEPHENSON, Esq., the veteran car-builder in this city, whose name as a pioneer in the street-car system, is everywhere known, and the productions of whose manufactory are in use in every civilized country. Mr. Stephenson is an acknowledged authority in his department, and his views will doubtless surprise many who are anticipating the epoch of electric force, "Keeley Motor" power, or some other substitute for the sure-footed horse. The various experiments in this city, upon the 4th, also 2d and 3d Avenues; in Brooklyn; Philadelphia; and elsewhere in this country and in Europe, were referred to in detail. Of all the tramway roads in existence, within city limits, Atlantic Avenue in Brooklyn is cited as the only one now using steam as a propulsive power directly attached to the cars.

The reason assigned for the failure is the simple fact that sufficient traction cannot be had upon the rail to overcome the difficulty so often arising from grades and curves, rains, or mud upon the surface. In the case of the 2d and 3d Avenues, the weight of the motors was much increased, and eight-wheeled cars were finally used, resulting however, in the destruction of track, in "spreading" of rails, etc., and experiments were abandoned, after 7 years of trial. Mr. S. humorously referred to a tramway road in a town in New Zealand, where, it was claimed, steam was successfully used instead of horses. An investigation developed that in this case the "T" rail was used upon ties laid upon the surface of the street—a method hardly to be tolerated in towns or cities usually.

The "Cable" system as operated in Chicago was favorably spoken of by Mr. Stephenson, as more likely to come into use. This, he admitted, had advantages, especially

upon lines where heavy grades exist; yet it is not at all demonstrated that even the cable system can be economically operated in any instance in comparison with horse power.

We hope in subsequent issues to have communications in our Tramway Department from the pen of Mr. Stephenson. In the meantime we invite expression upon the foregoing statements from those interested.

A "Cable" Road in New York.

A CABLE street-car road is to be constructed in this city. The route will be: 125th street, East River, West to 10th Avenue, through 10th Avenue to 180th street. The road will be double-track. Two cables in each track will be introduced, to provide against delays from breakage, etc., as often experienced elsewhere. D. J. Miller, Esq., is the engineer in charge of construction. Mr. Miller also superintended the construction of the cable roads in San Francisco and in Chicago. Our readers will doubtless recognize his name as that of a contributor to the columns of the AMERICAN RAILROAD JOURNAL.

The Cable Traction Question in England.

RECENT correspondence in *Engineering* contains a reply to a Mr. Conrad, in which the above matter is discussed. The writer, W. N. Colam, says: "In the first place, Mr. Conrad is evidently of the opinion that cable tramways are only suitable 'for such steep grades as locomotive engines cannot be worked with *advantage* on' or as he might have said, cannot be worked *at all* on; and I am surprised he did not gather from Mr. Findlay's paper (which he quotes) that the cable system was not introduced into Chicago for ascending steep grades, as that city is nearly a dead level, but that the tramway companies there adopted it to supersede horses solely on account of the wonderful engineering and financial success it had proved itself to be for some years previous, in San Francisco. I may also add that in Philadelphia, which is a particularly level city, the leading tramway companies have decided to convert their horse trams into the cable system, after first using horses, then steam engines, and then again horses; but not until they had thoroughly satisfied themselves of its suitability by constructing and running a test line. The same has also been done in many cities of the United States, including New York. Mr. Conrad is also sadly out with regard to what will be required to carry out the cable lines now in course of construction in England. In the first place he has been 'informed' that a five hundred horse-power engine costing two thousand pounds is to be used, instead of which, one of about forty horse-power nominal has been estimated for; he also tells us that 'cast-iron chairs of a *large* size and a very *expensive* pattern' have to be used, which I think may be most easily and quickly answered by saying that they *weigh* little more than some used on existing horse tramways for carrying the permanent way, and that they have been tendered for at the low figure of 4*l.* 9s. 6d. per ton. I will not enter into the subject of the relative merits of the Winterthur, the Wilkinson, or any other locomotive engine used for tramways, but I think most engineers will agree with me that haulage has been extensively and very economically used for pulling heavy trucks in the mining districts of this country for many years, and the cable tramway system is only the same thing, so constructed that it can be controlled to a nicety by the car-driver, and carry the public through the crowded streets of our cities with safety and comfort."

The Tramway in England.

HALF-YEARLY MEETINGS.

THE *Railway Times* of August 4, reports the half-yearly meeting of the North Metropolitan Tramways, held at the City Terminus Hotel, London, Mr. George Richardson presiding. The report stated that the gross receipts amounted to £143,779 and the total expenditure to £109,751, leaving as net profit £34,028. The sum available for dividend was £35,165. Out of this sum it was proposed to appropriate £34,650 to the payment of a dividend to the proprietors, at the rate of nine per cent. per annum, subject to deduction of income-tax. The balance £515 would be carried forward. The Chairman, in moving the adoption of the report, stated that a trial had been made of the use of thirty-one mules on a certain part of their system, and they had so far worked very satisfactorily. If they were found to be profitable to the company a larger number would be obtained. In reply to a shareholder, the Chairman stated that the falling off in the traffic receipts was due to some extent to the bad weather at the beginning of the year, and consequently many of their regular passengers traveled by railway. The report was adopted.

The same issue of the same journal contains an account of the half-yearly meeting of the Wolverhampton Tramways, held in London, and presided over by Mr. J. M. Gillies. In moving the adoption of the report, the Chairman said there had been a decrease in every item of the expenditure, except that incurred in the maintenance of the permanent way, and even that was a very slight one. The roads were in very good order, and the buildings and stables of the company were likewise in a state of thorough repair. Then as to the earning expense, there was naturally a decrease in the earnings, as they had been running less mileage. Mr. Foley inquired if the directors had any intention of introducing steam-traction, or whether they entertained the idea of using mules to draw the cars. The Chairman replied that they had already had some experience of steam, and while the system worked very well with them, yet they found it was more expensive. As to the employment of mules, judging from the experienee of the London companies, such, for instance, as the North Metropolitan, they could not do better than they were now doing. The report was then adopted.

A CHARTER was granted at Harrisburg, Pa., on the 22d ult., to the Philadelphia Traction Company, of Philadelphia, with a capital of $5,000,000. The directors are William H. Kemble, Peter A. Widener, William L. Elkins, George R. Yarrow, George W. Elkins, and George D. Widener. The directors own all the stock. The object of the company is the construction of cable motors and other appliances for a traction passenger railway, and the furnishing of the same.

On Bond with the Road-bed in Street Railroad Construction.

IT is a general thing to treat of the road-bed in street railroad construction as of an ordinary foundation. In so doing, some points of radical difference are often overlooked. A foundation presents its area of greatest cohesion and stability at the bottom. Constructed purely for purposes of support, its nature is to become less massive as it ascends. Of a foundation it may be said that it depends upon increase of area as a support. Speaking of its mass, it may be said that it decreases as it ascends.

A road-bed presents very different conditions. It may be defined as "a foundation for a moving load." It consequently cannot depend upon increased area as a support, but rather upon distribution of area. Its greatest cohesion and mass are not below but above. In truth a road-bed may without exaggeration be considered a foundation turned downside up. It is a surface prepared for support and wear by a compact and durable crust. It is hence a result that piercing this crust brings us to softer material. It is a misfortune that the present street railroad construction pierces the compact part of the road-bed, and finds *its starting point in the softer substratum.*

It is open to conjecture, even if it does not admit of absolute proof, that the cross ties in ordinary street railroad construction serve more to hold the track to gauge than to support it; and, contrary to the general impression, a large factor of support exists in the side friction of the system. It is further a rational deduction that the system would be more thoroughly supported if it were possible to float it in the compact crust of the road-bed, than it now is by the softer substratum. In the construction of a street railroad, no bond with the street is attempted. The railroad, while *in* the road-bed, is in no sense *part thereof.* There is with the present system no means of avoiding this disadvantage. So long as a flat and shallow rail is used, so long must timber be used as a stringer or stiffener. So long as timber is used must the system (owing to the depth thereof) pierce through the hard upper crust, and depend upon the softer soil beneath for its support. It is an engineering fact that natural bond is more to be depended upon in the cohesion of a structure than any artificial means of adhesion. By natural bond we mean the tendency of all particles to interlock and become mutually supporting. In concrete, the interlocking of the particles of the mass contributes as much to the strength thereof as the cement. In a structure, it is the bonding of the points rather than the adhesion of the mortar that gives stability. It is noteworthy that in nature, absolute adhesion is the exception rather than the rule. It is a further fact that where excessive stability is required, it is secured better by the natural bond of a number of particles (slight in itself but infinite in number) than by any means of artificial connection. An earth embankment, depending for its existence on its angle of stability only, is more efficacious against shot and shell than the most elaborate casemates or stone fortifications.

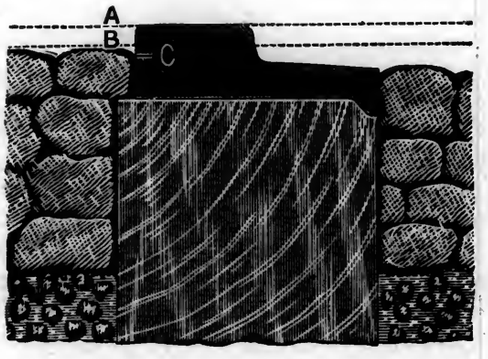
It does not appear impossible to depend upon the compact upper surface of the road-bed for support to the track, and to secure in a street railroad a perfect bond with the street. The average thickness of the metalling of a street or road-bed, may be taken as from 8 to 12 inches. We desire to float the rail in the compact upper crust. It must therefore be of less height than the depth of the metalling, say four and a half inches. This leaves a sufficiency beneath the same. We next want one rail anchored in or bonded with this crust, so that it is not free to move either way. To do this, we must present a cross section to each cardinal point. There is but one form available, viz., that of the girder. See illustration.



Here is a form that within the necessary dimensions gives ample stiffness, and enables us to dispense with the stringer. As compared with a 45-lb. tram-rail and a 5 x 9 stringer combined, it is three times as strong. It further presents an opposing surface to movement in any direction. Capable of perfect jointing, it is virtually continuous, and must be regarded as a system and not as a single rail. Hence it has an element of strength contributing to its stability which is absent in the tram system.

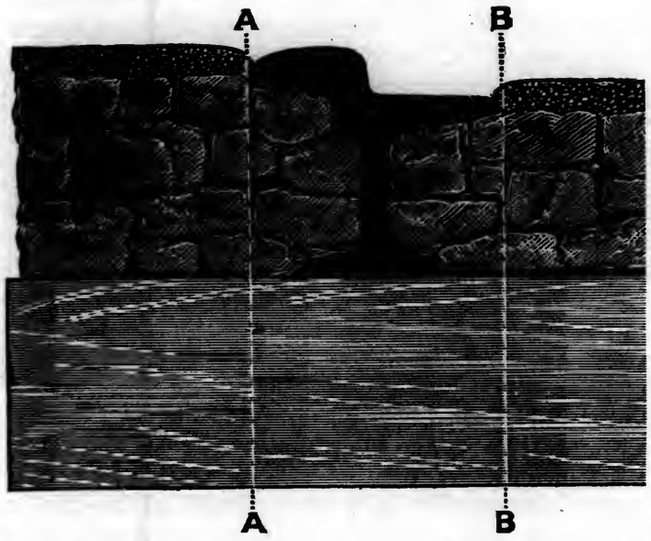
Any force applied to move or displace it, such as the impact of a heavy wagon, can only be applied at *one point.* This is met by resistance at *all points.* The part attacked cannot yield unless the whole system goes too. It is not possible to conceive of a force in practice that could achieve this. The impact of a six-horse loaded wagon would be as nothing compared to the resistance offered.

It is not, however, necessary to fall back upon the strength and stability of the system. Taking a given section of the rail as a unit, the result must be the same so long as the road-bed bonds with the rail. In paved streets this bond needs no discussion. In macadam or gravel, the bond is equally efficacious. In the tram system, the road-bed becomes quickly grooved adjoining the stringer. Referring to the drawing, it will be seen that it could not be otherwise.



As soon as the road-bed has settled down and worn, the head forms an obstruction to a passing wagon-wheel, see A B. The wheel slides or skids, and the rut is thus started. From this starting point it quickly deepens. The wheels wedge the street out from the stringers, as there is no bond

between the two. The only way the street can move is from the stringer.



In the form shown, this is not so. Noting the lines A A and B B, it is evident that instead of having a point of application from which to act in the destruction of the street, as in the case of the stringer, a wheel is as much supported here as in any other part of the street. In actual use this point has been demonstrated. The two systems laid side by side at the same time have exhibited the difference noted. After three years' use the road-bed is as perfect as when laid with the girder rail; with the tram, it is grooved adjoining the stringer. In English practice, the head of the rail is narrower than the general American practice. The girder rail has been long used there and found valuable; but owing to the difference of proportion noted, a thorough bond cannot be as well secured as in the same type of rail adapted to American practice; and thus, while retaining all the other advantages, one of the most important is lost. When put into dollars and cents, the point discussed is one that effects large and permanent savings in street railroad use, and is one that should not be ignored.

The Standard Index and Register.

THIS clever device, used and emphatically recommended, among many others, by the Central Park, North and East River Railroad Company, New York, the Norwich (Connecticut) Street Railroad, the Broadway and Seventh Avenue Railroad of this city; and the Metropolitan Railroad Company, of Boston, after careful comparison with other inventions of the kind, is manufactured by the Standard Index and Register Company, Nos. 138 and 140 Fulton Street, New York City. We spare a few lines of space to the statement of some of its peculiarities and advantages.

The Standard Index and Register is a fixture in the car, and becomes a part of the car. It cannot be tampered with, and it is impossible to use imitation instruments. The permanent or continuous register is put upon a paper dial, mechanically, by the conductor, and removed from the instrument when the day's work is completed, and compared with the amounts of money turned in during the day by him. Therefore a complete record of each day's work is obtained from the conductor himself, which cannot be obliterated. This principle of registering is entirely new, and positively stops any collusion between your employés. When a fare is collected by the conductor and he sounds the alarm, he has made a registration that cannot be changed or obliterated, even if it passes through a dozen or more hands. This being a fact, it must neccessarily turn in more money than any other system of registering.

The use of trustworthy fare-registers is one of the most important subjects for a railroad company to consider; which observation gives great value to the announcement that the manufacturers of the Standard Index and Register offer a proposition to street car companies, to place upon their cars, free of charge, one or more of their instruments for trial.

Further particulars are supplied by the manufacturers when applied for by call or letter.

List of Recent Patents for Inventions Relating to Tramways.

BEARING DATE AUGUST 7, 1883.

282,564. MOTOR: Townsend Poore, Scranton, Pa. Filed March 5, 1883.
282,609. REIN-HOLDER: Edwd. E. Brewster, Holly, Mich. Filed April 3, 1883.
282,721. HORSE-COLLAR: Francis A. Hake, Cuero, Texas. Filed Nov. 4, 1882.
282,783. CONDUIT FOR TRACTION-ROPE RAILWAYS: Edward Samuel, Philadelphia, Pa. Filed April 27, 1883.

BEARING DATE AUGUST 14, 1883.

283,058. SUPPORTING CABLE USED IN PROPELLING CARS: Marks Arnheim, New York, N. Y. Filed April 23, 1883.
283,132. HORSESHOE: John J. Mervesp, New York, N. Y. Filed Mar. 14, 1879.
283,259. TRACE-BUCKLE: Emmit G. Latta, Friendship, N. Y., assignor of two-thirds to Adrian C. Latta, same place, and Harvey D. Blakeslee, Buffalo, N. Y. Filed May 3, 1883.
283,298. CAR-WHEEL GUARD: John Stephenson, New York, N. Y. Filed Feb. 23, 1883. Patented in England June 15, 1877.

BEARING DATE AUGUST 21, 1883.

283,385. MEANS FOR SHARPENING HORSESHOE-CALKS: Chas. F. Elmes, Chicago, Ill. Filed Feb. 23, 1883.
283,417. BREECHING-STAY FOR HARNESS: Robert P. Pearson, Philadelphia, Pa., assignor to Clanmar P. Hoskins, same place. Filed Sept. 12, 1882. Renewed July 17, 1883.
283,434. HORSESHOE: Frederick W. Steiner, Plainfield, Ill., assignor of one-half to Charles A. Steiner, same place. Filed June 21, 1883.
283,539. HALTER: Chas. S. Upton, Spencerport, N. Y. Filed June 15, 1883.
283,610. HORSE-COLLAR PAD: Joseph Kallista, Peoria, Ill., assignor of one-half to William C. Hanna, same place. Filed June 20, 1883.
283,693. SIDE AND CENTER LAMP AND REFLECTOR FOR STREET-CARS: Emile Boesch, San Francisco, Cal. Filed Aug. 18, 1882.
283,706. FARE-REGISTER: Jas. Goodfellow, New York, N. Y., assignor to John E. Mulford, same place. Filed June 11, 1883.
283,717. HORSE-COLLAR: Chas. Marin, St. Louis, Mo., assignor of one-half to Geo. J. Dailey, same place. Filed June 5, 1883.

BEARING DATE AUGUST 28, 1883,

283,849. HORSESHOE: John D. Billings, New York, N. Y., assignor of one-half to Charles White, same place. Filed March 12, 1883.
283,990. KNEE-BOOT FOR HORSES: Joseph Fennell, Cynthiana, Ky. Filed July 11, 1881.
284,020. TRACTION-CABLE RAILWAY: Orlando H. Jadwin, New York, N. Y. Filed March 31, 1883.
284,032. STREET-CAR BELL: John T. Marett, Philadelphia, Pa., assignor to Halstead & Spencer, same place. Filed May 28, 1883.

NOVEL ROLLING STOCK FOR TRAMWAYS.—The Australian government, which controls and operates all the railways in the colony, some time ago sent Mr. George Downe, superintendent of motive power of tramways, to this country to secure the construction of a combined locomotive and passenger car for use in the streets of Sydney. The construction of the car was intrusted to J. C. Brill & Co., and of the engine to the Baldwin Locomotive Works. The result of the united work of the two establishments was shown recently on Pennsylvania avenue, and in a trial trip up the Philadelphia and Reading Railroad for a distance of twenty-six miles and return, during which everything worked in a satisfactory manner, and a speed of fifteen miles an hour was made. The car has somewhat the appearance of a Frankford dummy, though much larger and more massive. The length of the car and engine is thirty-eight feet, and their combined weight fourteen and a half tons. The interior of the car is divided into four compartments, the seats in each facing, similar to those in a summer street car. Each seat accommodates six persons, making room for forty-six in all. There are also seats on top of the car, forty-two more being accommodated there. The streets through which this car is to run are quite narrow, and the tracks are laid on each side next the curb. The cars are inclosed, ingress and egress to each compartment being had through sliding doors on one side, the opposite side not being accessible for passengers. The car is finished inside and outside in sycamore and ash in their natural colors, presenting a bright, cheerful appearance. There is a platform at the rear end similar to common street cars, and from it a stairway leads to the roof. There is also a stairway in the same direction between the front end of the car and the engine. The engine is of the compound type, and in its construction are incorporated several special ideas of Mr. Downe, which it is expected will operate advantageously in their different points and connections. As the grades of the streets in Sydney are very heavy—that on the roads upon which this car is to run being one in nineteen—the engine is provided with a vacuum brake. It requires but one man to operate the machinery, which is placed at the sides of the car, and inclosed in strong sheet-iron boxes to preserve it from dust, etc. The engine has a capacity of twenty-five miles an hour, while the regulation speed in Sydney is ten miles.—*Railway World.*

THE "bob-tail" cars, which, with all their advantages, are not generally liked by the people, have received the condemnation of a New York jury, which, possibly, is no argument against their employment, in the judgment of those who prefer them. The facts of the inquiry were that a child aged one year and a quarter was run over and killed on the tenth ult. by a car of the Ninth Avenue Car Company, the driver, it was alleged, not having seen the child, as he was making change at the time. At the inquest, the jury, after returning a verdict in accordance with the facts, recommended the employment of conductors on all street-car lines in the city, and censured the Ninth Avenue Company for not employing any. The coroner refused to accept the verdict at first, insisting that the jury intended only to make a recommendation, and not to censure the company. The jurors, however, declared that they meant all they had said, and the verdict was therefore recorded. We wonder what the verdict of the jury would have been had there been a conductor on board the car. The running over of persons by cars having both a driver and conductor, is probably not less unknown in the streets of a great city, than the said deplorable event in the case of the much-maligned "bob-tail."

THE BRIDGE CARS.—The delay in running cars on the New York and Brooklyn Bridge provoked the publication of a letter published in the New York *Times*, on the 22d ult. Its writer, "A. B. M.," inquires: "Has Col. Paine lost his grip? If not, why are the cars not running on the Brooklyn Bridge? It appears to me that a great deal of public money is being wasted and the dear public are suffering for want of proper conveyance over the great bridge, to say nothing of the poor patrolmen being bored to death answering questions as to why the thing don't go; and all this for the reason that Col. Paine wants the glory of being the inventor of a new improved grip to carry his cars along the cable. Why lose time experimenting when a perfect system can be had? The California system has been a complete success, both in San Francisco and in Chicago, and had it been used the cars would have been running on the bridge a month ago, and enough money saved to have paid for the California patent. How much more time is to be wasted in experiments? Another great mistake, I think, has been made in having such large and heavy cars for so short a route. A smaller and lighter car would have been much easier handled every way, and particularly in switching at each end of the bridge."

THE *Deutsche Bauzeitung* published an article recently concerning a contract for an electric street railway, which was awarded to Siemens & Halske, under the management of Engineer Swieger, formerly of the City railroad of Berlin. The first designs for an electric railway in Vienna were originated by Berthold Mendel, who, in 1881, talked on the subject to the Vienna authorities, and also in 1882 in Berlin. That he understands the subject thoroughly will be seen from the fact that a diploma was awarded him in Munich, at the Electrical Exposition, for his lectures upon the matter. The material for the construction is now at Königsberg. The firm of Siemens & Halske, although familiar with this work, gave the construction to Berthold Mendel.

ATTENTION is called to the advertisement of Messrs. Lewis & Fowler, elsewhere in the JOURNAL. They advertise an improved "Alarm Register Punch" which received the First Prize Medal at the Exposition in Chicago, and is in use on many of the Brooklyn City railroads and elsewhere.

THERE are at present 5,722 street cars running daily in the city of Boston, and 22,703 men employed by the same corporations. The Metropolitan Railroad Company has 75 miles of track, 31 patent switches and 29 hand switches; the South Boston Railroad 9 patent and 19 hand switches; the Middlesex, 19 patent and 16 hand switches; the Union, 12 patent and 19 hand switches; the Charles River, 3 patent and 5 hand switches.

Registers and Register Punches.

VALUABLE AUXILIARIES FOR TRAMWAY COMPANIES—A NEW DEVICE FOR EXTRA BAGGAGE ON STEAM ROUTES—APPLIANCES INTRODUCED BY MESSRS. BEADLE & COURTNEY, 1193 BROADWAY, NEW YORK.

VISITORS at the "National Exposition of Railway Appliances" in Chicago, were much attracted to the handsome booth of Messrs. Beadle & Courtney, general agents of the Railway Register Manufacturing Company, of Buffalo, in which were exhibited their ingenious devices for registering fares collected on horse-cars, and thus insuring *full returns from conductors*, a result never reached under the old systems, where no checks were put upon the peculations of dishonest employés. The importance of the object sought may be better understood when it is known that this company alone owns over 100 patents. The rather comprehensive reference to the scope of the

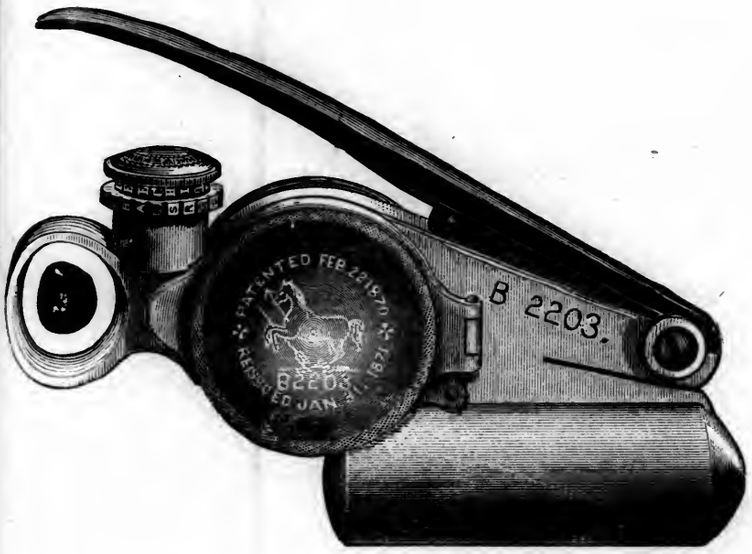


FIG. 1.

company's operations, which we quote herewith, will suggest the variety of interests represented: "Owners and Manufacturers of the latest Designs, Improvements and Inventions in Registers, Indicators, Classifiers, and Punches, for the Recording of fares collected on Street and Steam Railroads."

In order to introduce more fully this important interest to those operating tramway roads especially, we will subjoin a few illustrated descriptions from the catalogue of Messrs. Beadle & Courtney. Fig. 1 illustrates a device which is well received, and has had large sales. It is called

THE ALARM REGISTERING PUNCH.

This register is in general use throughout the United States and Europe. It is claimed to be the most perfect check that has ever been placed before the public for the collection, registration and classification of fares on street railroads, especially where different rates of fare and tickets are collected. The duties required of the conductor in the use of the Bell Punch are such that failure to comply will—and cannot fail to—attract the attention of passengers, and those interested in the road. An additional feature of this Register is the receptacle for retaining the clippings, thereby giving an audit of the conductor's account, proving the correctness or otherwise of his returns for all fare collected. Fig. 2 has certain advantages which are detailed herewith, and it is called

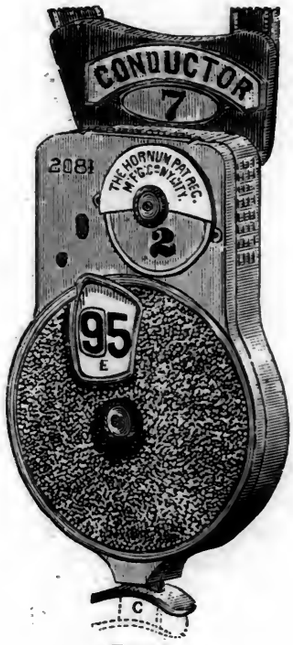


FIG. 2.

THE "HORNUM" REGISTER.

It is light in construction, and is acknowledged to be a valuable and reliable machine. It has the Direction Plate attachment, showing the direction in which the car is



FIG. 3.

going, insuring the turning back of the trip register to zero at each end of the road. Among the improvements is the positive movement in the main Register, increasing the weight of the machine less than one-half ounce, and the *strength* over three hundred per cent. For a road with one or two rates of fare, it is particularly recommended.

Fig. 3 is a device but recently introduced, is very perfectly adapted for the use intended, and has been adopted upon several of the largest tramway roads. It is called

THE "BENTON" REGISTER.

It shows a figure on front of Register for every cash fare or ticket taken, has also an indication plate which the conductor is obliged to turn at the end of the route, showing which way he is going, which insures the turning back to zero of the trip dial at the end of each half trip. On the back side is the permanent Register, which records 1,000,000. It is also provided with a punch at top, to cancel passes or tickets.

The next device introduced (Fig. 4) is unlike the preceding, in that it is not carried by the conductor, but is attached to the car itself. It is simple in construction, is not liable to get out of order, and is largely in use. It is called

THE "POND" REGISTER.

Messrs. Beadle & Courtney speak of this device as follows: "Our Pond Stationary Register is especially adapted for use on large and small cars. The Indication Plate will show the direction the car is traveling, and at the end of each trip the direction or indicating plate must be shifted so as to denote the direction of the next trip or half trip. This is done by turning a thumb-pin at the right hand upper corner of the machine, but before this can be done, the trip or visible Register must be first set back to zero. This Register is put up with rod connections operated by a wrench from any part of the car, and is absolutely under the control of the conductors on large cars and drivers on small cars, preventing passengers or evil-disposed persons from ringing or tampering with it, as is done with Registers operated by a strap." New and important improvements have been lately added to the "Pond" device.

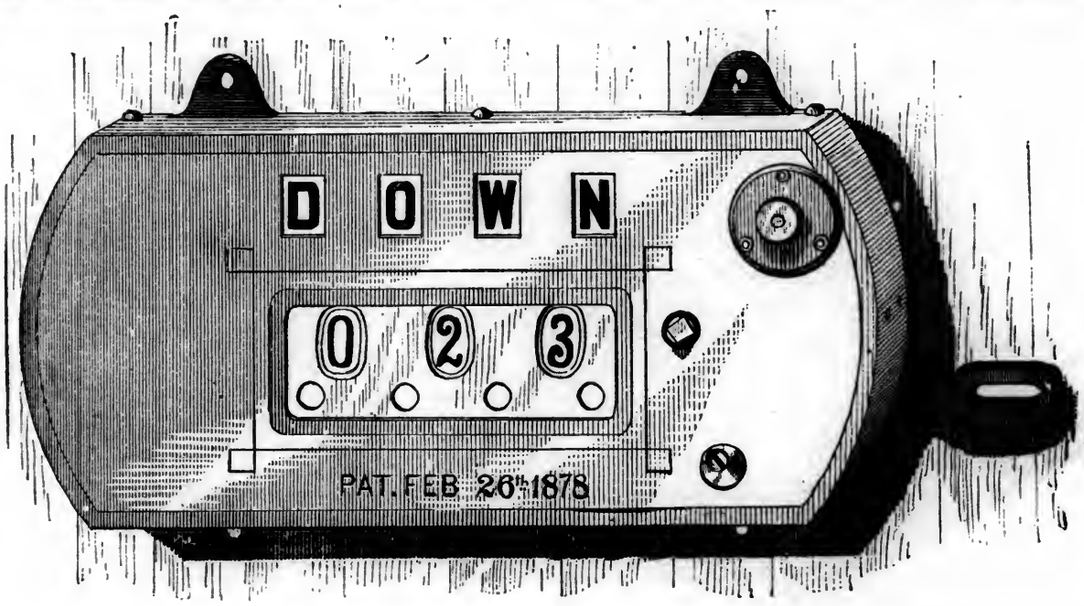


FIG. 4.

We now introduce (Fig. 5) an appliance which has been thoroughly tested, and is giving great satisfaction wherever used. It is called

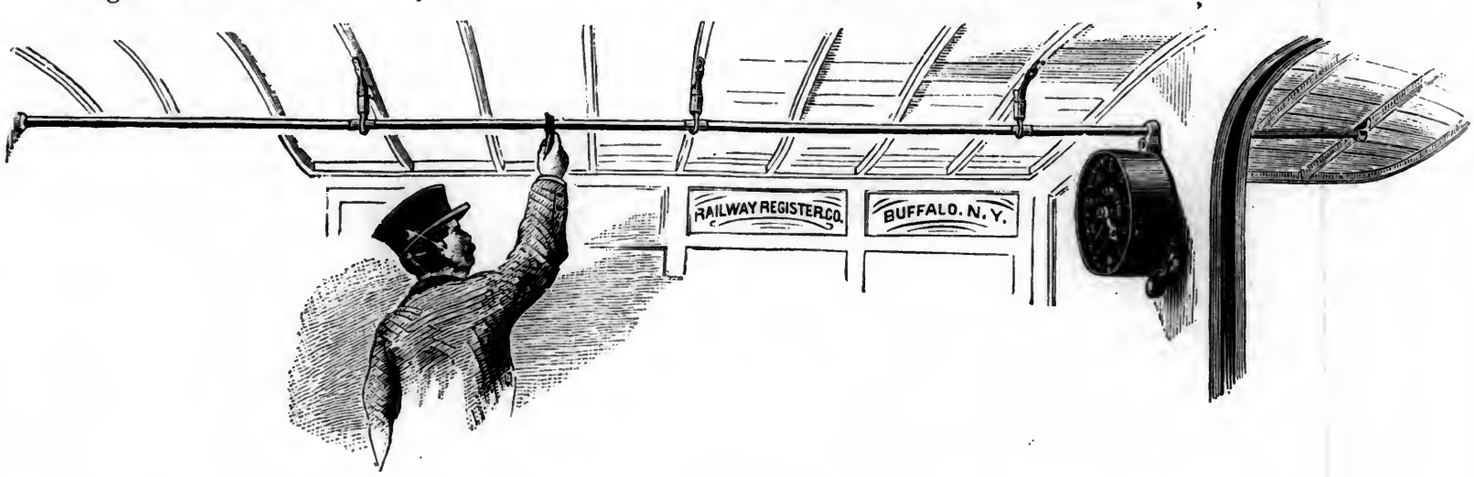


FIG. 5.

THE "MONITOR" REGISTER.

We will again quote from the manufacturers' description, as being so explicit and full that it needs no further statement from us to explain its workings:

"The Monitor register is of the 'Duplex' kind, and resembles a clock in appearance; the dial is divided into one hundred divisions and numbered prominently; a long hand or pointer moves over this dial, and records the fares taken on each trip. A smaller hand, in connection with a

hundredth disk, records the totals, and constitutes what is known as the 'Permanent Register,' or Register of Totals. The Trip Register is set back to zero at the end of each trip by a key.

"This machine is a very strong, durable Register, and when there is but one or two rates of fare only to be recorded, it is one of the best Registers of its kind. The conductor can record the fares on the platform as well as in the car.

"This machine has a large bell, which can be distinctly heard from any part of the car.

"The cut herewith shows the position of the MONITOR in the car, and the conductor about to record the fare he has just collected.

"The rod connection used with this Register can be applied to the POND REGISTER. We also have a rod attachment to be used in connection with our Registers for double-ender cars, where the fare-box is used, and so arranged that the driver records the fares deposited in the box. This rod connection is constructed so that when one end is used the other end is locked automatically."

A new and improved "Monitor" has lately been introduced by Messrs. Beadle & Courtney, in which the "up" and "down" attachment is a particular feature. This device they state is owned and controlled exclusively by them.

The "Railway Register Manufacturing Company" make all kinds of connections, to be used with machines suitable for one-horse cars, omnibuses, etc. All their Registers are fully covered by letters patent in this and foreign countries. It is claimed for the company that their products are made with a view to *durability* and *strength* in construction. As the company supply the devices on royalty, and warrant to keep all in perfect repair at their own expense, it will be seen that from an economic point of view this policy is wise; and the users of their Registers will be saved the annoyance occasioned by the failures of inferior appliances. Were our space not limited, we would give a list of the tramway roads using the Registers and Punches introduced by Messrs. Beadle & Courtney. The list, however, may be found in the finely illustrated catalogue published by the firm, which will be furnished upon application to these gentlemen, by mail or otherwise, at their address, 1193 Broadway, New York City, or 426 Walnut-st., Phila., Pa. After a careful inquiry into the merits of the various devices, we can advise that a most thorough test of those to which we have referred, will give satisfaction.

Before closing this article, we wish to add that the company are experimenting now with some new devices, which are to be adapted for use also upon Steam Railroads. From the promises of Messrs. Beadle & Courtney in this connection, we may safely advise that the advantages involved will be very great. Correspondence with them will doubtless elicit valuable information.

Our attention was called to a new device for the "Baggage" departments of Railroads. It is designated an "Extra Baggage Receipt." It has for four years been in constant use in the Union Depot in St. Louis, and indorsed by the General Agent, W. M. Steele, as an invaluable adjunct to his department. He says that since it was adopted, it has been a perfect safeguard to the traveler against the extortion practiced by employés upon travelers having extra weight of baggage, and has also insured to the companies using it at St. Louis, their just charges. We desire to call the attention of all those in responsible connection with Baggage Departments upon steamers and railroads, to this "Extra Baggage Receipt" introduced by Messrs. Beadle & Courtney, as an invaluable aid to them. It will indicate from the fractional part of a dollar to any amount, and is so simple that it can be easily understood. Awards were made to Messrs. Beadle & Courtney both for the excellence of their exhibit as such, and for the superiority of their products, at the Exposition in Chicago.

TRAMWAY NOTES.

AN electric tram-car, invented by Mr. Holroyd Smith, of Halifax, N. S., is being run in that town with satisfactory results.

CONDUCTOR (declining a temperance tract which a lady handed him with her fare), "much obliged, but we ain't allowed to take any perquisites whatever, mum."

ABOUT 3,000 persons attended the concert in Prospect Park, Brooklyn, Aug. 18. A feature of the music was a street railroad galop in which the conductor's whistle was sounded. A copy of the music was given to every woman passenger on one line of cars running to the Park.

THE Johnstown Steel Street Rail Company have commenced the manufacture of the rails at the Cambria Iron Works. The rail has the ordinary L face used on the street railways, but the body and bottom are made like the T rail. This form obviates the use of wooden stringers, as the rails can be spiked directly to the cross ties and connected by splice bars, making a continuous rail. They are made of Bessemer steel.

THE Supreme Court of Michigan holds that in cases of injury on railways there is no presumption of negligence on the part of the company. Passengers must take the responsibility of informing themselves of the every-day incidents of railway traveling.

SAN FRANCISCO has eight lines of cable road completed, or nearly so. The total length is fifty miles. Chicago comes next with twenty-two miles. The average cost is stated to be about $120,000 per mile.

AN OMNIBUS PROPELLED BY ELECTRICITY.—Some very interesting experiments were made to-day at the Place de la Concorde with one of the Omnibus Company's large three-horse vehicles. It was driven by electricity at a rate superior to that at which omnibuses generally go, and was turned with surprising facility. At 5 o'clock, M. Cochery, Minister of Posts and Telegraphs, M. de Lesseps, MM. Dietz, Rouvier, Blanchard, Burgues, Col. Barolez and several gentlemen got into the omnibus, which, to the astonishment of a large crowd, was seen to move off rapidly without horses. The mechanism by which it was propelled was simple. Four accumulators, weighing 2,500 kilogrammes, and giving out a force of 72-horse-power, had been placed under the seats and put in communication with a Siemens machine fixed under the vehicle.—Paris letter in *London Standard*.

THE Phœnixville Iron Works have received a contract from the Union Passenger Railway Company, of Philadelphia, to build the iron frame-work for eight miles of cable road.

New Inventions.

TO INVENTORS.

THIS department of the JOURNAL is devoted to descriptions of new inventions applicable to railroads. We publish each month a list of the same, and invite each inventor to forward us a description of his invention, believing the publication of facts regarding them will be perused with interest by railroad men, and all interested in the development of our railroad system. *We make no charge for publishing these.*

The descriptions of an invention should be carefully prepared, and written only on one side of the sheet, each sheet properly numbered. Cuts (electrotypes) illustrating the device are always an aid, and attractive to the reader. These should be procured and sent with the "copy." They can be sent by mail. The position of the cut or cuts should be noted in the "copy."

List of Patents for Inventions Relating to Railways, Machinery, Etc.

BEARING DATE AUGUST 7, 1883.

282,480. SPEED-GOVERNOR FOR STEAM-ENGINES: David E. Adams, Pittsburgh, Pa., Administrator of James D. Willoughby, deceased. Filed May 10, 1883.

282,484. SPARK-CONDUCTOR FOR LOCOMOTIVES: Chester C. Baum, Dover, Del. Filed May 29, 1883.

282,487. SPEED-INDICATOR: Thos. Blanchard, Stoughton, Mass. Filed March 29, 1883.

282,503. DIRECT-ACTING ENGINE: Isaac B. Davis, Hartford, Conn. Filed April 27, 1883.

282,505. ROTARY ENGINE: Dana Dudley, Boston, Mass., assignor to David S. G. Doane, Cohasset, Mass., and D. A. Plecker, Mount Crawford, Va. Filed Jan. 2, 1883.

282,507. CAR-AXLE: William S. Eberman, Sandy Lake, Pa. Filed May 19, 1883.

282,510. CAR-TRUCK: Leonard Finlay, Little Rock, Ark. Filed May 12, 1883.

282,519. MECHANICAL STOKER: George E. Hibbard, Evanston, Ill., assignor of one-half to Nelson C. Gridley, same place. Filed April 20, 1883.

282,520. ROTARY ENGINE: George E. Hibbard, Evanston, Ill., assignor of one-half to Nelson C. Gridley, same place. Filed March 16, 1883.

282,528. VELOCIPEDE: Thos. B. Jeffrey, Chicago, Ill. Filed May 31, 1882.

282,569. CAR-SIGNAL: Wm. H. Rushforth, Camden, N. J. Filed Oct. 4, 1882.

282,593. CAR-WHEEL: Jas. M. Whiting, Providence, R. I., assignor of one-half to Julius Carroll and George C. Eliott, same place. Filed May 14, 1883.

282,594. LUBRICATOR FOR CAR-JOURNALS: S. Lloyd Wiegand, Philadelphia, Pa. Filed Dec. 8, 1882.

282,598. CAR-DOOR FASTENER: Arnold W. Zimmerman, Chicago, Ill. Filed April 9, 1883.

282,616. CAR-COUPLING: Frank L. Eager, Palmer, Mass. Filed Jan. 30, 1883.

282,623. REFLECTING-MIRROR ATTACHMENT FOR LOCOMOTIVES: Daniel Frost and Henry Cartwright, Portland, Oregon. Filed May 5, 1883.

282,631. RAILROAD-GATE: George A. Hall, South Waterford, Me. Filed April 20, 1883.

282,672. CAR-BRAKE: John G. Schiller, Youngstown, Ohio, assignor of one-half to Joseph Whitman Smith, same place. Filed April 27, 1883.

282,701. GRADING AND LEVELING MACHINE: Jas. M. Buckley, Portland, Oregon. Filed Jan. 15, 1883.

282,706. STOCK-CAR: Isaac H. Dahlman and Charles Dahlman, New York, N. Y. Filed June 4, 1883.

282,714. CAR-BRAKE: Humphrey M. Glines, East Boston, Mass. Filed June 1, 1883.

282,730. AUTOMATIC RAILROAD SIGNAL AND ALARM: Henry G. Jones, Darby, Pa. Filed July 19, 1882.

282,732. CAR-COUPLING: Squire Richard Jones, Lacon, Ill. Filed May 25, 1883.

282,734. CAR-COUPLING: Eli Kirk, Clarksville, Ohio. Filed May 25, 1883.

282,739. RAILROAD-RAIL AND RAIL-JOINT: Peter A. Locke, Silver Cliff, Col. Filed April 3, 1883.

282,748. CAR-BRAKE: Jacob D. Miller, York, assignor to himself, and Jacob Broadbeck, Jeffersonborough, Pa. Filed Nov. 25, 1882.

282,751. COAL-CAR: Jas. A. Millholland, Cumberland, Md. Filed April 16, 1883.

282,753. REVERSING-GEAR FOR ENGINES: Joseph V. Moore, Des Moines, Iowa, assignor of one-half to H. C. Ensminger, same place. Filed April 19, 1883.

282,773. UTILIZING EXHAUST-STEAM: David Renshaw, Braintree, Mass. Filed Jan. 6, 1883.

282,776. AUTOMATIC ALARM DEVICE FOR RAILROAD-CROSSINGS: Elias E. Ries, Brooklyn, N. Y. Filed Aug. 31, 1882.

282,789. GOVERNOR FOR STEAM-ENGINES: Jesse M. Smith, Detroit, Mich. Filed May 11, 1883.

282,796. CAR-AXLE BOX: Oscar S. Stearns, New York, N. Y., assignor of one-half to Amos Rogers, same place. Filed Dec. 2, 1881. Renewed May 29, 1883.

282,804. FEED-WATER HEATER AND PURIFIER: William P. Thompson, Philadelphia, Pa. Filed March 12, 1883.

282,808. STEAM-GENERATOR: James R. Vance and Stephen D. Parker, Geneva, N. Y. Filed March 8, 1883.

282,815. TRANSFERRING CARS FROM ONE TRACK TO ANOTHER: William Wharton, Jr., Philadelphia, Pa. Filed May 10, 1883.

282,825. CAR-WHEEL CHILL: William Wilmington, Toledo, Ohio. Filed Jan. 21, 1881.

282,827. RAILROAD-CAR: Thomas L. Wilson, Port Hope, assignor of one-half to Eugene Harmon Davis, Toronto, Ontario, Canada. Filed Jan. 22, 1883.

282,828. DEVICE FOR REMOVING PISTON-RODS FROM CROSS-HEADS: James E. Worswick, Montgomery, Ala. Filed May 17, 1883.

282,845. STEAM-BOILER FURNACE: Edward Clark, New York, N. Y. Filed May 25, 1883.

282,871. CAR-AXLE BOX: John G. Ernst, Baltimore, Md., assignor of one-half to Jeremiah D. Mallory, same place. Filed March 1, 1883.

282,887. BAGGAGE-RACK FOR RAILWAY-CARS: Henry C. Hart, Detroit. Mich. Filed June 12, 1883.

282,889. CAR-VENTILATOR: Samuel C. Hill, Samuel D. Webb, and Risdon M. Odell, Washington, D. C. Filed July 7, 1883.

282,894. VALVE: Timothy Holland, Troy, N. Y. Filed Oct. 17, 1882. Renewed July 9, 1883.

282,896. CAR-COUPLING: Reuben R. Hunt, Lexington, Ky. Filed Jan. 3, 1883.

282,902. FEED-WATER HEATER: John Keller, St. Louis, Mo. Filed April 9, 1883.

282,906. BALANCED SLIDE-VALVE: John Charles Knecht, Sigel, Ill. Filed March 23, 1883.

282,907. ROTARY STEAM-ENGINE: John Andrew Knight, Marlborough, N. H., assignor to himself and Richardson H. Montgomery, West Plains, Mo. Filed Jan. 16, 1883.

282,908. GOVERNOR FOR STEAM-ENGINES: William Knowles, Bolton, County of Lancaster, England. Filed July 10, 1883. Patented in England Jan. 21, 1882, No. 310.

282,910. CAR-COUPLING: Jas. Learmonth, Corsicana, Texas. Filed Jan. 15, 1883.

282,931. SCALE FOR STEAM-ENGINE INDICATORS: James W. See Hamilton, Ohio, assignor to the Ashcroft Manufacturing Company, of Massachusetts and New York. Filed Dec. 18, 1882.

282,932. REVERSING-GEAR FOR ENGINES: Freedom G. Shepard Andrew J. Hoag, and Andrew Thomson, Battle Creek, Mich., assignors to Nichols, Shepard & Company, same place. Filed Feb. 5, 1883.

282,933. SPARK-ARRESTER: Nicholas Shoptaugh, Booneville, Ind. Filed June 30, 1881. Renewed April 18, 1883.

BEARING DATE AUGUST 14, 1883.

283,011. SNOW-PLOW: Lyman Morgan, Port Washington, Wis. Filed Dec. 9, 1881.

283,017. LUBRICATOR: Charles H. Parshall, Jr., Detroit, Mich. Filed Jan. 4, 1883.

283,028. LOCOMOTIVE-BRAKE: Charles J. Schiller, St. Louis, Mo., assignor to the American Brake Company, same place. Filed May 10, 1883.

283,046. REVERSING-VALVE FOR STEAM-ENGINES: Charles H. Upton, Minneapolis, Minn. Filed March 5, 1883.

283,063. MOTIVE POWER: Harry Blake, Chicago, Ill., assignor to himself and C. E. Blake, same place. Filed Feb. 5, 1883.

283,064. STEAM-PUMP: James H. Blessing, Albany, N. Y. Filed Mar. 11, 1882.

283,076. RAILROAD-TIE AND FASTENING: Joseph L. Chapman, Philadelphia, Pa. Filed Sept. 26, 1882.

283,078. CAR-SPRING: Edward Cliff, Oswego, N. Y., assignor to Cliff & Righter Company, (Limited,) same place. Filed March 24, 1883.

283,146. SAFETY-VALVE: George W. Richardson, Boston, Mass., assignor to the Consolidated Safety-Valve Company, Hartford, Conn. Filed May 2, 1883.

283,150. REFRIGERATOR-CAR: Levi Rutter, Newmanstown, Pa. Filed March 3, 1883.

283,151. CAR-DOOR TRACK: William Scarffe, Brooklyn, N. Y. Filed June 1, 1883.

283,152. ELECTRIC-CIRCUIT TRACK-INSTRUMENT: Charles A. Scott, Boston, Mass. Filed April 26, 1883.

283,174. PHOTOGRAPHIC PASSENGER-RECORDER: Charles W. Weiss, Brooklyn, assignor of one-half to Charles Kruse, New York, N. Y. Filed Aug. 30, 1882.

283,176. LUBRICATOR FOR ENGINE-CYLINDERS: Jonas A. Wheeler, Vandalia, Mo. Filed April 27, 1883.

283,216. BALANCED SLIDE-VALVE: William M. Deal, Philadelphia, Pa., assignor to himself, James W. Courtney, and Robert F. Frankenfield, same place. Filed Nov. 6, 1882.

283,218. ADJUSTABLE ELEVATOR-PLATFORM FOR VESSELS FOR CARRYING RAILWAY-CARS: J. Joseph De Rycke, New York, N. Y. Filed Jan. 18, 1883.

3,219. CAR-BRAKE AND STARTER: Arthur S. Dickinson, Springfield, Mass. Filed July 2, 1883.

283,226. STEAM-ACTUATED VALVE: George E. Elliott, Calais, Me., assignor of one-half to Edward J. Crangle, same place. Filed April 20, 1883.

283,230. RAILROAD CROSS-TIE: Henry F. Flickinger, Bucyrus, Ohio. Filed April 21, 1883.

283,231. ELECTRIC LOCKING MECHANISM FOR SWITCH AND SIGNAL LEVERS: Oscar Gassett, Boston, Mass. Filed April 4, 1883.

283,232. RAILWAY SIGNAL LOCKING APPARATUS: Oscar Gassett, Boston, Mass. Filed July 19, 1882.

283,254. LOCOMOTIVE HEAD-LIGHT: J. Miller Kelly, Rochester, N. Y. Filed June 18, 1883.

283,261. DIRECT-ACTING COMPOUND ENGINE: Erasmus Darwin Leavitt, Jr., Cambridge, Mass., assignor to Dauphin S. Hines, William A. Perry, and Charles C. Worthington, New York, N. Y. Filed June 27, 1883.

283,275. NUT-LOCKING DEVICE: James S. Peironnet, Wheaton, Ill. Filed June 14, 1883.

283,281. RAILROAD-SIGNAL: Caleb M. Risley, Woodbury, N. J., assignor of one-half to Joseph A. Green, same place. Filed Feb. 24, 1882.

283,311. CASTING CAR-WHEELS: William Wilmington, Toledo, Ohio. Filed July 10, 1883.

283,338. ATTACHMENT FOR BOILER-FURNACES: Geo. S. Gilbert, Baltimore, Md., assignor of one-third to Thomas M. Broderick, same place. Filed Jan. 15, 1883.

283,340. FREIGHT-CAR: Nathan Hanson Greene, Montreal, Quebec, Canada. Filed Feb. 19, 1883.

283,359. STEAM-ACTUATED VALVE: John W. Russell, South Hadley Falls, assignor to the Valley Machine Company, East Hampton, Mass. Filed Feb. 28, 1883.

283,361. LUBRICATOR: Richard Stevens and William Imrie Mann, Braddock, Pa. Filed Dec. 6, 1882.

BEARING DATE AUGUST 21, 1883.

283,367. CHILLED-CAR-WHEEL BORING AND TRUING MACHINE: William P. Barclay, Chicago, Ill. Filed July 12, 1882.

283,368. FLUID-PRESSURE CAR-BRAKE: Henry Barratt, York, Pa., assignor of one-third to Jacob O. Miller, same place. Filed Feb. 5, 1883.

283,399. LUBRICATOR: Friderich Jarecki, Erie, Pa. Filed Oct. 27, 1882.

283,438. BRAKE-SHOE: Alexander B. Todd, Philadelphia, Pa. Filed June 6, 1883.

283,441. STOCK-CAR: John K. Weber, Titusville, Pa. Filed May 4, 1883.

283,446. CAR-BRAKE: William A. Wilde, Chicago, Ill. Filed May 25, 1883

283,479. VALVE: Thaddeus Galvin and John Galvin, Detroit, Mich. Filed May 21, 1883.

283,481. LUBRICATOR: John Graham, Chicago, Ill. Filed May 21, 1883.

283,533. HEAD-REST FOR CAR-SEATS: William Bell Taylor, Waltham, Mass. Filed April 28, 1883.

283,534. COMPRESSED-AIR BRAKE: Albert Thayer and Martin Joseph Connelly, Roxbury, Mass. Filed July 7, 1883.

283,535. RAIL-STRAIGHTENING MACHINE: Cyrus P. Tittle, Johnstown, Pa. Filed March 3, 1883.

283,538. VALVE-GEAR FOR STEAM-ENGINES: William Bright Turman, Waldron, Ark. Filed Dec. 1, 1882.

283,566. CYLINDER-COCK: James N. Chamberlin, Marietta, Ohio. Filed May 31, 1883.

283,619. AUTOMATIC CAR-SCALE: Charles Lederer, Norfolk, Neb., assignor to Bernhard W. Jonas and Charles M. Selby, same place. Filed June 21, 1883.

283,631. CAR-WHEEL: Edward B. Meatyard and James White, Geneva, Wis. Filed Sept. 22, 1882.

283,632. RAILWAY-TRACK: John A. Merrill, Pottstown, Pa., assignor to E. & T. Fairbanks & Co., St. Johnsbury, Vt. Filed April 18, 1883.

283,633. SIGNAL-LANTERN: Christian E. Metzler and John H. Burrell, Jr., Philadelphia, Pa., assignors of one-third to James Calhoun, same place. Filed June 20, 1883.

283,656. AUTOMATIC CUT-OFF FOR ENGINES: Jno. B. Pitchford, San Francisco, Cal. Filed March 22, 1883.

283,691. LID FOR CAR-AXLE BOXES: Jackson R. Baker, Jersey City, N. J. Filed Jan. 11, 1883.

283,695. LUBRICATOR: Constant W. Booth, Brooklyn, N. Y. Filed May 11, 1883.

282,704. ENGINE: Robert M. Fryer, New York, N. Y. Filed Dec. 9, 1882.

283,708. BOILER-FURNACE: William P. Hall, Piqua, Ohio. Filed June 5, 1883.

283,711. PISTON-ROD PACKING: Henry C. Hunt, Newark, N. J. Filed Feb. 21, 1883.

283,721. AUTOMATIC SWITCH-CLOSER: Charles L. Northrup, Salem, Mass. Filed March 3, 1883.

BEARING DATE AUGUST 28, 1883.

283,743. CAR-COUPLING: Asher W. Avery, Verndale, Minn., assignor of one-half to Enoch L. Ingalls, same place. Filed Sept. 30, 1882.

283,749. RELIEF-VALVE FOR LOCOMOTIVE-ENGINES: Robert C. Blackall, Albany, N. Y. Filed July 5, 1882.

283,754. MEANS FOR STOPPING RAILROAD-TRAINS: John Chandler, Brooklyn, N. Y. Filed April 2, 1883.

283,759. ELECTRIC LOCOMOTIVE: Leo Daft, Greenville, N. J. Filed Sept. 6, 1882.

283,760. RAIL FOR ELECTRIC RAILWAYS: Leo Daft, Greenville, N. J. Filed March 27, 1883.

283,761. ELECTRIC LOCOMOTIVE: Leo Daft, Greenville, N. J. Filed June 14, 1883.

283,773. CUT-OFF VALVE: John Graham, Chicago, Ill. Filed Feb. 23, 1883.

283,784. CAR-REPLACER: Michael Herrens, St. Louis, Mo. Filed Sept. 22, 1882.

283,788. VALVE: John Johnson and Louis Wagner, Chicago, Ill., assignors of one-third to Gerald Allen, same place. Filed Sept. 18, 1882.

283,839. SPARK-CONDUCTOR FOR LOCOMOTIVES: Frederick B. Wells, Montreal, Quebec, Canada. Filed Dec. 12, 1882.

283,842. GOVERNOR: Edward Wright, Worcester, Mass., assignor to the Wright Machine Company, same place. Filed May 28, 1883.

283,845. CAR-COUPLING: Samuel B. Archer, Pittsburgh, Pa., assignor to the Archer Automatic Car-Coupler Company, Saratoga Springs, N. Y. Filed July 5, 1883.

283,860. LUBRICATOR: Samuel G. Cabell, Washington, D. C., assignor to Flora B. Cabell, same place. Filed March 26, 1883.

283,875. RAILWAY-SWITCH: James Evans, Oneonta, N. Y. Filed April 20, 1883.

283,920. CAR-COUPLING: Robert Powell, Kansas City, Mo. Filed Aug. 12, 1882.

283,931. LUBRICATOR: Allen W. Swift, Elmira, N. Y. Filed June 13, 1828.

283,947. RAILWAY AND CAR: Louis Augspath, Little Rock, Ark. Filed Oct. 9, 1882.

283,978. VALVE FOR STEAM-ENGINES: Riley Doty, Leonardsburg, Ohio. Filed Dec. 27, 1882.

283,991. CAR-COUPLING: William Livingston Fisher, Bay City, Mich. Filed Dec. 27, 1882.

284,010. DIRECT-ACTION STEAM-PUMP: John Henwood, Philadelphia, Pa., assignor to himself, Joseph C. Whitaker, and Charles R. Scull, all of same place. Filed March 9, 1883.

284,028. CAR-WHEEL: Jas. T. Leighton, New Haven, Conn. Filed Feb. 21, 1883.

284,035. GAUGE FOR CUTTING CAR-BRACES: Christopher Mattice, Delhi, N. Y. Filed May 9, 1883.

284,103. STOCK-CAR: Jas. Clark Weaver, Cutler, Ind., assignor to himself and John Felthoff, same place. Filed May 29, 1883.

284,108. CAR-COUPLING: Jessie W. White, Red River Iron Works, Ky. Filed June 11, 1883.

284,114. ELECTRIC SIGNAL FOR RAILWAY-STATIONS: Aaron D. Blodgett, Boston, Robert M. Read, Cambridge, and Jacob P. Tirrell, Boston, Mass. Filed Dec. 20, 1882.

284,116. STOCK-CAR: George D. Burton, New Ipswich, N. H. Filed May 31, 1883.

284,125. ROTARY STEAM-ENGINE: Walter Gibb, Pittsburgh, assignor to himself and A. C. Milliken, Millvale Borough, Pa. Filed March 23, 1883.

284,141. ROOF FOR RAILWAY-CARS: Will A. Murtfeldt, Cincinnati, Ohio. Filed Feb. 15, 1883.

284,144. RAILROAD-SWITCH STAND: Patrick O'Hern, Chapman, Neb. Filed April 19, 1883.

284,154. RELIEF-VALVE FOR RAILWAY PRESSURE-BRAKES Robert J. Wilson, Pittsburgh, Pa. Filed March 22, 1883.

284,155. RAILWAY-RAIL AND FISH JOINT, ETC., FOR RAILWAY RAILS: Frederick Charles Winby, Westminster, England. Filed Feb. 17, 1883. Patented in England June 7 1882, No. 2,678.

284,157. METALLIC RAILROAD-TIE: John W. Young, Fort Moroni, Ariz. Filed March 9, 1883.

Inventions and Inventors.

THE New York *Sun* printed the following admirable article in a recent issue. It (the article) is worthy of preservation for reference. The writer is a master-hand at saying a great deal interestingly in a few words:

The number of successful inventors is always large, but the number of unsuccessful ones is very much larger. Only the other day 17,000 models of rejected inventions were sold for old junk. There is always somebody working at the unsalable problem of perpetual motion, or making a flying machine. It not infrequently happens that, after a patent has been refused to an inventor, a subsequent application is granted by a different examiner.

It sometimes happens that a patent is granted to one man after somebody else has failed to receive a patent for the same invention. This is a fruitful source of litigation. Indeed, litigation about patent rights is so common that in the introduction of any valuable patent the legal expenses of defending it are a large part of the capital required. Immense sums were spent in defending Morse's patents for telegraphing, and the various patents for sewing machines, India rubber manufacture, and of the inventions that have revolutionized industrial processes. But, when rights are once established by law, the profits are enormous. It was shown in a recent case before the United States Court, that for royalties alone on the manufacture of barbed fence wire more than one million dollars a year were paid.

Inventors are now chiefly busy with electricity, and the Patent Office is deluged with devices for making new uses of the modern marvel, or for using it with new appliances. Many of these inventions run in the direction of motors. The opinion has gained some ground lately that storage batteries of electricity are not as successful as was at first expected. It is asserted by some that no storage battery ever gives out as much electricity as it receives, and that every moment decreases the amount yielded. Edison says the best storage battery is a ton of coal, which can be used at any time to drive a dynamo machine. Others, however, still think that the storage battery will produce wonderful results.

Inventors have always sought to utilize the forces of nature for the conservation of power. A good deal of time and money have been spent on efforts to utilize the force of the rise and fall of the tide. According to some plans the water is to be stored in a reservoir at high tide, and used to turn a water-wheel when the tide falls. Another plan is to get the power from the rise and fall of a float. There used to be a tidal mill at Astoria and another at Charleston, S. C. The large amount of land required to get the requisite area of water surface is considered an insuperable objection to tidal mills.

A good deal of money has been expended on solar engines, in the hope of getting power out of the sun's rays. John Ericsson, the inventor of the Monitor and a thousand other things, has made some beautiful solar engines, and not long ago an inventor had a model of a solar engine on the top of the Cooper Union building, and managed to get up steam in a boiler. The trouble is, however, that the sun does not always shine, and the solar engine, to be of any practical use, must be accompanied by a storage reservoir of power, that can be kept for a rainy day. After all, coal is nothing but the heat of the sun stored in past ages for present use.

There is no telling of what great value the discovery of the simplest fact may be. When bromine was discovered by Ballard in 1824, nothing of importance was expected from it. Now it is a valuable factor in photography, and a useful remedy for nervous affections.

Capital is never wanted to try even the most foolish inventions. Not long ago an inventor had an idea that he could, by the use of a naked wire, produce a return current, and avoid electrical disturbances in cables. He could have got the capital to lay a long cable under ground to try his experiment. He was with difficulty dissuaded from doing this by a practical man, who saved him lots of money by wrapping several miles of cable about a barrel and arranging the naked wire as proposed by the inventor. The result was a complete failure, but the cost of the experiment was comparatively trifling. This is an illustration of the large amount of money that can be wasted through ignorance. Men will work away at an idea with no knowledge of what has been done or what can be done, only to discover at the end what they should have known at the beginning.

A good deal of money has been spent in the effort to introduce ice machines. There is, however, a strong competition to be encountered, since ice may always be had for the gathering, and transportation is cheap.

Fire escapes are numbered by the thousand. Hardly a day passes that the Fire Commissioners are not compelled to test some new plan. A good deal of room is taken up in the Patent Office with the models of these contrivances.

A very good example of the facility with which capital can be secured to promote the most chimerical ideas may be seen in the story of the Keely motor. The stockholders have been pretty thoroughly bled already, but are compelled to bleed still more in the hope of saving what they have already expended. The varying fate of capital invested is seen in the contrasting results of the two steam heating companies in New York city, one of which has proved a most lamentable failure, while the other has had a measure of success. It is not so certain that money invested underground will always return a fair interest. It may be necessary to incur great expense when an underground cable gives out, as the whole route may have to be dug up to find the break.

Accidental discoveries have supplied some of the most valuable processes of the industrial arts. It is said that the rolling of cold iron was first suggested by the fact that a workman who was placing a piece of hot iron in the rolls carelessly permitted his tongs to be drawn in. He noticed that they were rolled, and not broken. He called the attention of the Superintendent to the occurrence, and this led to investigation and experiment, and the discovery that cold rolled iron is equal to steel for shafting purposes. The process of rolling iron cold was not long afterward patented, and millions of dollars have been made out of the patent.

There are many similar instances where observing work-

men have called attention to valuable processes. A signal one was in the early period of the cotton manufacture, when a good deal of trouble was caused by the cotton sticking to the bobbins. All the workmen in the mill were delayed by the necessity of stopping work to clean the bobbins. At last one workman found a way to obviate the trouble. He, and he alone in all the mill, had clean bobbins. For a long time he kept his secret to himself. He finally revealed it on the promise of a pint of beer a day for life. His secret was to "chalk the bobbins." That little scraping of chalk on the bobbins saved millions of dollars a year, and the observing workman got not only his beer, but a competence.

Each extension of modern enterprise and skill brings with it a train of inventions. The railway, the telegraph, the steamboat, the development of iron, electricity, and petroleum, have each produced a long line of inventors more or less successful, so that each of these industries might have a creditable exhibition by itself.

Aid for Indigent Inventors.

THERE is, perhaps, nothing sadder in the life of the trade journalist than the occasional visits he receives from machinists or others who have devised some new invention of value to the world, but who through poverty have either been compelled to sell it for a song or have waited for the "good time coming," only to see some unscrupulous person walk off with it and make a fortune. No one can read of the great struggles of Goodyear during his experiments in the production of rubber goods without a feeling of profound pity; nor can one, without indignation, talk with a gray-haired old man in a neighboring city, not fifty miles from Cleveland, concerning the manner in which certain railway magnates swindled him out of the first model of what is now the Pullman Palace Car. While America is the most generous country in the world toward her inventors, yet scores and hundreds there are who are sharing the proverbial inventor's fate because of lack of capital and the necessary incitement to use their inventive talent for the highest ends. It is with pleasure, therefore, that we hail the Humanitarian Invention Association, which owes its existence to the careful planning of some of the large-hearted professional and business men of Youngstown, Ohio. Lest there be any doubt as to the genuineness or the practical a ms of the association, we mention as its President, Samuel G. Hair; as its Vice-President, Hon. L. D. Thoman, member of the Civil Service Commission; as its Secretary, Dr. James F. Wilson, and as its Executive Board, A. B. Cornell, Hon. L. D. Woodworth and Milton S. Tracy. These names are surely a guaranty that there is nothing chimerical in the enterprise. Briefly stated, the objects of the association are threefold: First, to develop the inventive genius of the country; secondly, to aid indigent inventors in procuring patents; thirdly, to make for valuable patents the best financial return possible. The basis of the work is a fund of $10,000 guaranteed by the ten members composing the association. Out of this fund are to be paid cash premiums for the best article invented in any particular line. For instance, the association now has a standing offer of a cash premium of $3,000, open till January 1, 1884, for the best invalid chair that can be devised. Inventions for which premiums are paid are to be handled by the association, one-third of the net profits being paid the inventor, one-third divided equally among all the competitors, and the remaining third being used by the association in the maintenance of an ample fund for payment of future premiums. To meet contingent expenses, an entrance fee of one-half of one per cent. of the cash premiums offered is required—in the case of the invalid chair offer, $15. Awards are to be made by a board of five competent and disinterested persons, and unsuccessful competitors, in addition to their share of one-third of the profits arising from the prize invention, will be aided in procuring patents on their own inventions, if worthy. Other commendable features of this novel organization might be dwelt on did space allow. From one of the directors we learn that the Secretary already has a very large correspondence, and that the benefits of the association are even now beginning to make themselves manifest. It certainly deserves well, for it is both practical and humanitarian.—*Trade Review and Western Machinist.*

Rail Joints.

WM. S. HUNTINGTON, whose pen is not strange to the readers of the RAILROAD JOURNAL, has contributed to the *Railroad Gazette* a communication on rail joints, the substance of which is of considerable value.

There is scarcely anything more desirable in railroad operation than a joint fastening and support that fills the bill, but it is certainly an unwise policy to equip a long line of road with fastenings that have not been subjected to a thorough practical test. If a railroad official is not satisfied to use the best fastenings in use, and has faith in a dozen, more or less, of recent invention, he can give them all a trial and select the best as a standard.

A recent trip over a road some hundreds of miles in length, a good share of which has lately been relaid with steel rails on new ties and well ballasted, showed that the managers have made a mistake in their selection of joint fixtures. They are using a splice-bar (4-bolted) that is quite extensively used, and a nut-lock that is bringing wealth to the patentees and manufacturers; but the joints are all loose and the rails are pounding down at the ends. Too much noise for a first-class road caused the writer to pay attention to the matter and discovered the cause of the clatter, which reminded one of the early days of railroads, when the speed of the train was known by the sound of the wheels at the joints, which is not the case on our best roads of to-day.

While most inventors of rail-joints fall short of their aim, others overdo the thing and get the joints too stiff. It is of the utmost importance that rails have the same strength at the joints as at other parts and no more. There is a certain amount of depression of all rails, and this keeps a certain distance in advance of the wheels, causing a "wave of depression," and the most desirable joint is one that will transmit the wave unbroken to the next rail and return to its normal position. If the rails are bound by too rigid clamps or grips, the wave is broken, and rolling stock is badly shaken up in consequence.

A brief consideration of the various forces which tend to destroy joints will give inventors of those fixtures something of an idea of what is expected of them, when they in-

form the railroad public that they have invented a perfect rail-joint. It must be capable of resisting vertical strains varying from a few hundred pounds (the weight of the wheels of an empty car) to as many tons (the weight on driving-wheels), providing always that they yield to the pressure the same as the middle of the rails, and retain sufficient elasticity or spring to regain their position on a plane with the rail centres. The splice-bars and other vertical supports must be of such a nature that they will not bend and set, under any amount of pressure. The nuts, keys, wedges or other fastenings must resist the ever-changing jar and vibration incident to the various weights of wheels and speeds at which the trains are run, as for instance: The first load is a heavy locomotive truck, the next the heavier drivers, then the lighter tender trucks, then the trucks of an empty freight car, followed by those of a loaded one, and so on through a long freight train; the amount of depression changing from the minimum to the maximum and *vice versa*, with astonishing rapidity. And from the fast express train to the slowest freight, the joints are subjected to a punishment ranging from the slightest to the most severe, the light taps sandwiched between the heavy blows in a thoroughly demoralizing manner, one blow being delivered before the joint has fully recovered from the preceding one. All this has a tendency to wear all the parts that enter into the make-up of a rail-joint, which soon causes a vertical motion of the rail ends, throwing them out of their plane and exposing them to the pounding of the wheels, which is an expensive operation. The lateral strain on joint fixtures must also be provided for. Bolts may be made fast with the most approved nut-locks, keys or other devices, but they very soon get loose, and then come rapid destruction of rails and ditching of trains. Bolts that are made very tight are liable to break by contraction in severe weather, or if not broken they stretch so that they will be loose when the weather gets warm, and no nut-lock has yet been produced that will compensate for contraction and expansion, and the cranky, hashed-up vibrations and mixed strains before mentioned. The splice-bars must be kept snug to the rails or they are no support whatever; and the splice-bars in common use and the general make-up of the average rail-joints are the most unmechanical and unsatisfactory of all railroad appliances. Another source of trouble with the common splice-bars is that when they become a trifle loose (and it is exceedingly rare that they are perfectly tight), the end of the rails will "cock up" when the wheels have passed the joint. In this way the ends of the rail have a vertical motion sufficient to expose them to severe pounding. Suppose the rear truck of a car has passed the joint just far enough to bring the forward wheels of the next car close to the joint. The end of that rail will be depressed, while the next rail will be raised all that the looseness of the joint will allow. The first mentioned truck depresses the rail on which it rests six or eight feet from its end. A tie between the wheel and the joint acts as a fulcrum, and the end of the rail rises at the same time that the end of the adjoining rail goes down. Thus the rails have a rocking motion, a tie a few feet from the joint acting as a fulcrum, and at the time that one rail goes down the other rises with the above-mentioned results. And the contraction and expansion of the rails have a destructive effect on joints; also, the counter-weights on driving-wheels, and it is difficult to conceive of anything that presents a greater array of difficulties to be overcome than the rail-joint. Every destructive mechanical force imaginable, and the elements also, are in constant warfare with that most abused of all railroad appliances. A perfect joint must be to all intents and purposes the same as any other parts of the rail, as to strength and elasticity. Many or all of the joints now in use would be far more serviceable if they were better cared for by trackmen. Many joints are destroyed by too much power on the long wrenches, by which the bolts are twisted off. Fairly snug is tight enough if kept so.

Important Railroad Invention.

MR. THOMAS H. GIBBON, of Albany, has invented a compound rail and boltless rail-fastener, which, it is claimed, possesses several points of special merit. Among them are the following, described by the *Railway Age:* That it forms practically a continuous rail, having all the smoothness of the old "compound rail," with all of its objections removed. It preserves the joint ties, the spikes being driven through the lugs and plate, locks the fastener to the rails, which prevents the spikes from working or becoming loose, and thereby preserves the fibre of the timber. This joint-fastener removes the weakness of the rail caused by drilling, punching, and slotting, and gives at least two-fold greater strength to the joint over any other portion of the rail; it also removes the expense in track maintenance occasioned by low joints. The shoulder of the fastener being boxed into the tie also makes the tie act as a tie rod, and materially assists in preventing the spreading of the track. Many derailments are no doubt caused by rails being cut too long, thereby throwing the rail-holes out of line with those in the fish plate, consequently necessitating the forcing of the bolts, and causing concealed defects which soon result in actual fracture of the rail at the weakest point; and also leaving no room for necessary expansion, thereby occasioning kinks in the track, accidents from which are invariably reported under the head of "unknown causes." This joint-fastener allows for any amount of expansion necessary in the judgment of the track engineer, without any regard to the length of the rail. "Creeping of the track" is practically impossible with this fastener, the rail being continuous and firmly locked to the ties. The expansion and contraction will, therefore, be uniform throughout the whole line. It also allows the wheel to glide over the frog without any perceptible jar, thereby removing one of the principal destructive agencies to wheels, track, and machinery. Although entirely dissimilar to the chair joint, fish plate, and fish and angle joint, it combines all the good features of each fastening without any of their defects.

THE custom of carpenters engaged in repairing old buildings, of carrying a small lump of lard or tallow on one of their boots or shoes, is much to be commended. A brother scribe records his observations of an experiment in driving nails into hard-seasoned wood, fairly dried. He says that the first two nails, after passing through a pine board, entered about one inch, and then doubled down under the hammer; but on dipping the points of the other six or eight nails into lard, every one was driven home without the least difficulty.

The DuBois Steam Generating, Superheating and Boiler Feeding Apparatus.

THIS invention has three distinct features, viz: 1. Instantaneous generation of steam from a spray. 2. Superheating the same, and 3. Automatically feeding the water to the generator by means of a weighted piston, which gives pressure to the water and sprays it in the generating cylinders. The apparatus may be utilized as a whole or in parts. For instance, the filming and superheating cylinders may be attached to any kind of a boiler or generator for the purpose of superheating the steam, or the automatic feeder may be attached to any kind of a boiler or steam generator for use (pumps or injectors requiring power to run them being entirely dispensed with.)

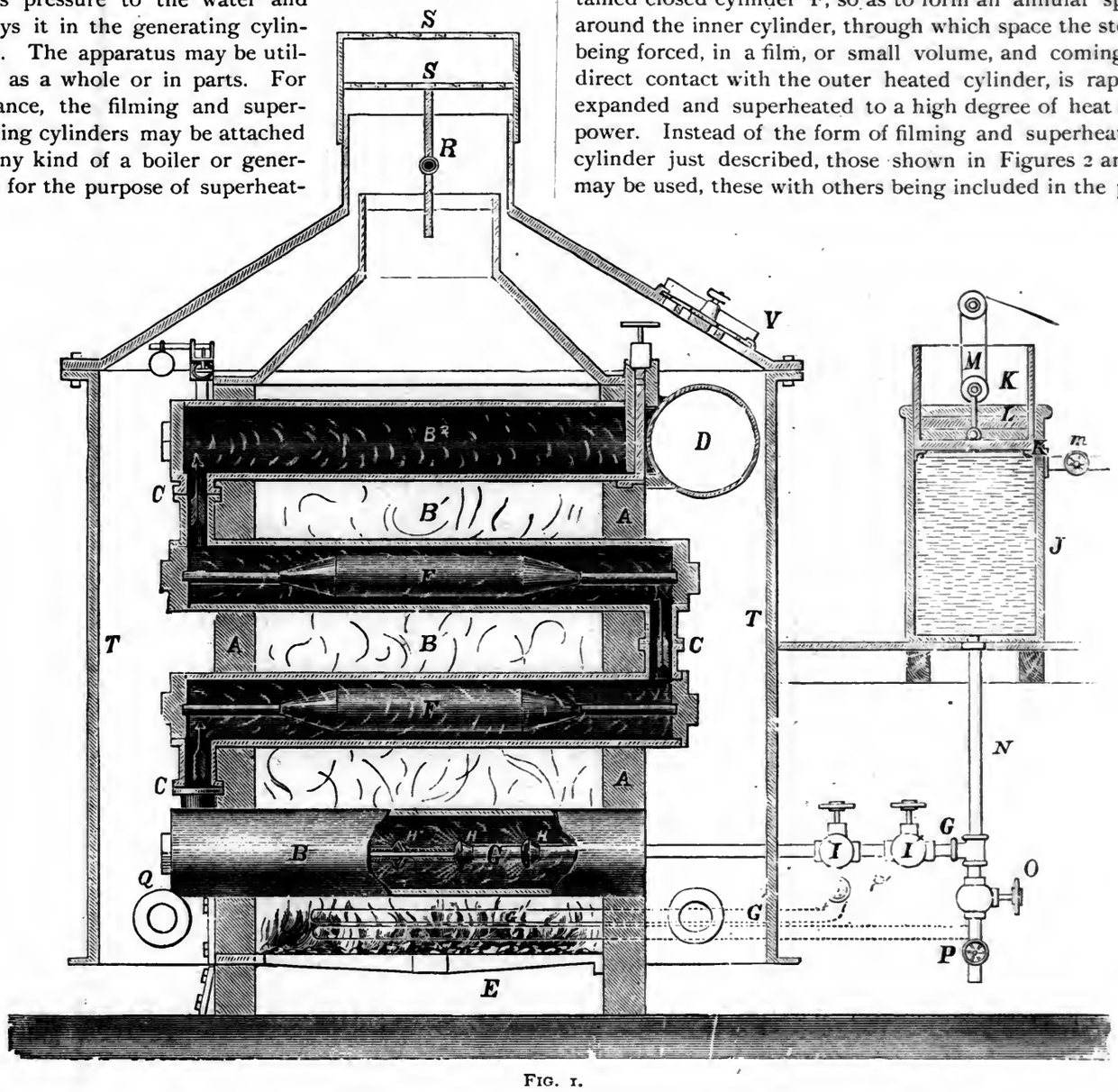


FIG. 1.

Fig. 1 shows the apparatus as a whole. The tank or standpipe J, is filled with water from the hydrant by means of valve m. The tank is provided with a piston K, with weights L. The pressure caused thereby causes the water to flow through pipes N and G, and is sprayed in the generating cylinder B. The steam thus generated is forced through outlets C, through the filming and superheating cylinders B^1 into superheating cylinder B^2, and finally into receiver D, from which it is distributed to pipes for heating buildings, or for power or other purposes. T is an outer shell of the apparatus which incloses an air space around joints of the apparatus, which are all on the outside of the furnace wall A, and away from direct contact with the fire. Q are ventilating doors which, when open, will cause a draft through said air space to keep the joints cool, if desired. R is the damper, and S the spark arrester. The filming and superheating cylinders B^1, are formed by placing within the main cylinder an inner contained closed cylinder F, so as to form an annular space around the inner cylinder, through which space the steam being forced, in a film, or small volume, and coming in direct contact with the outer heated cylinder, is rapidly expanded and superheated to a high degree of heat and power. Instead of the form of filming and superheating cylinder just described, those shown in Figures 2 and 3 may be used, these with others being included in the patents covering the invention. The principle of the superheaters is to divide the steam into small volume and subject it to the greatest heat; thereby getting the best possible results from the heat generated in the furnace with the smallest percentage of fuel. The water may be forced direct to the generator by closing the valves O and P^1, and opening the valves I and I^1; and by closing the valve I^1 and opening valves O, P^1 and I, the water will be forced through the coil G^1, running through the furnace E, and thereby become heated before being sprayed in the generator. The valve P is for discharging water from the pipes and tank after close of work. Any suitable device M, may be used to raise the piston or plunger. By this means a very little or no elevation to the tank, the pressure may be made to be considerable. Of course, the higher the

elevation of the water and the tank, the less weight will be required on the water. A point may be reached where no additional weight to the water will be required, but it will rarely be convenient to construct the standpipe in a building high enough. In place of the piston just described, that shown in Fig. 4 may be used. In this case, the piston or plunger K, is provided on the bottom with a valve S, and is pivoted at the top by rod r, to a lever R, weighted on its end by weights L, the water supply M, discharging directly into the plunger K. As the plunger is descending (and while work is going on), it becomes filled with water which adds weight, and consequently pressure, and upon raising it up the water passes into the tank J, through the valve S. By this means no time is lost in refilling the tank. By using a lever, a greater pressure can be obtained by less weight, the lever acting to force the piston down. Fig. 1 is an end view of the apparatus, showing one of a number of series of generating, superheating and filming cylinders used in an apparatus,

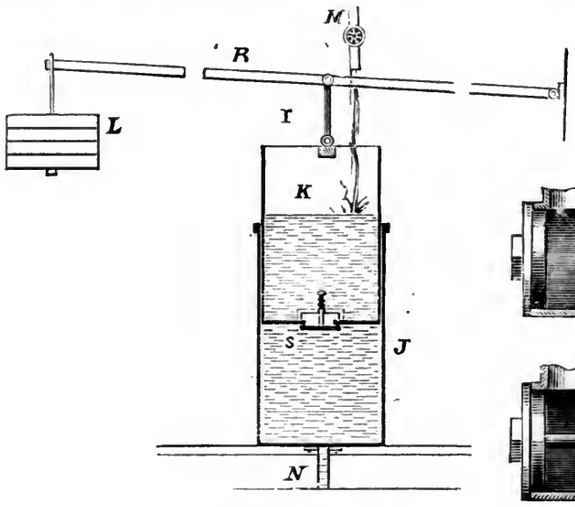


FIG. 2.

the number of series varying according to the power or heating capacity required. The cylinders are necessarily small, not being over three inches of internal diameter, and capable of standing great pressure, with safety-valves located at proper places. The principle of instantaneous generation of steam, however, is well enough understood by the reader to know that it is not attended with the danger of terrific explosions, as in the case of the boiler method, which occur when the water gets low and the boiler highly heated, causing a considerable body of water to instantly flash into steam with all its terrible effects. In this case, only a diminutive spray is kept flowing to the generator, the quantity being regulated by setting a valve for that purpose, and the quantity thus entering the generator is constantly generated into steam as fast as it enters, with no surplus to explode. The pressure by this apparatus may easily be developed to several hundred pounds to the square inch, and of course the steam contains a corresponding amount of heat. Independent of the increased motive force generated with a small percentage of fuel, the high degree of heat contained in the steam of high pressure will be found to have an advantage in heating buildings, and especially in heating buildings on a large scale, as in the case of running pipes underground and conveying the steam through these pipes a long distance, where common low steam is liable to condense, and spend the greater part of its force before reaching the building to be heated. In the many fields of industry where the apparatus may be employed, either as a whole or in parts as attachments to common boilers, the invention should meet with great success.

The inventor and proprietor, J. S. Du Bois, can be addressed at Camden, New Jersey.

Hall and Stock's Patent Railroad Car-Unloader.

CAR-UNLOADER, CAR SCALE AND TURN-TABLE—ALL IN ONE.

A MACHINE recently perfected by Almon Hall, of Toledo, Ohio, and H. F. Stock (the well-known railroad excavator man) marks a new departure in devices for removing coal, ore, grain and other bulk freight from railroad cars, and for weighing and turning locomotives or cars.

In unloading coal and ore from railroad cars into vessels and chutes, the usual process of shoveling the load into tilting buckets suspended from a swinging crane is slow and expensive. Where dumping cars of special con-

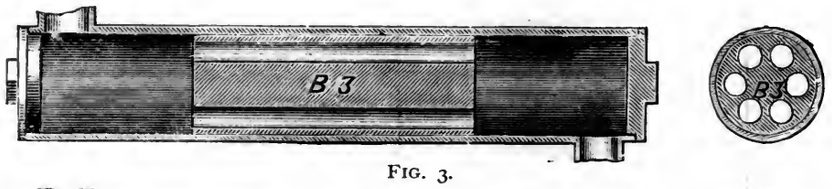


FIG. 3.

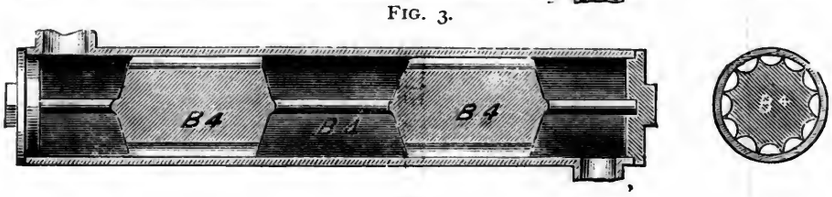


FIG. 4.

struction are employed, their capacity is less than that of the ordinary flat car, and they can be used but for one class of freight. In unloading such cars, elevated, permanent chutes are usually employed, approached by inclined tracks of heavy grade. This plan is also objectionable on account of the great original cost of the elevated ways, chutes and cars, and from the fact that valuable docks, and other spaces arranged on this plan, are rendered practically useless for other purposes.

The machine of Messrs. Hall and Stock is designed to avoid each of these objections, by providing means for lifting an ordinary car with its load, bodily, to any desired height; and for turning the car as upon a turn-table at any height to which it may be lifted, and at any point to which it may be lifted or turned; for tilting the car to any desired angle so that its load may slide or shoot from the end of the car, thus avoiding the necessity for derricks, special cars, inclined tracks, permanent chutes, etc. This machine when not in use is below the level of the track, out of the way of moving trains and out of sight.

This machine is especially valuable on low docks, in loading into vessels which, when light, set many feet above the track, but which settle down in the water as fast as loaded.

The device consists of a table or platform, of sufficient

length to receive a car, formed of I beams suitably braced and tied, upon the tops of which are bolted the track rails. The table when not in use rests on suitable supports, with its rails in line with the track. The car to be unloaded is attached to the table by chains or other suitable means. The table at its centre is supported, and oscillates upon trunnions journaled upon the top of a strong hydraulic lift. The machine near the top of the lift is provided with a small, double, reversible steam engine, supplied with steam through a flexible hose, which engine performs the operations of swinging and tilting the table. The upper section of the movable, vertical cylinder of the hydraulic lift is arranged to rotate horizontally, carrying with it the table or platform and the car which it supports (like a turntable), and is connected with the engine by suitable gearing. The table or platform is provided at either side with toothed racks of segmental form having for their center the trunnions upon which the table tilts. These racks (which are placed directly beneath the beams of, and serve as trusses for the table) are engaged by two pinions, one on each end of a shaft extending through the supporting column, which shaft is revolved by means of worm gearing connected with the engine. The pinions and curved racks being set in motion, the table with its car is tilted, the end board of the car swings out, and the load slides from the car. The worm gearing referred to constitutes a constant safety lock, preventing tilting motion of the table except when the gearing is moved by the engine. By means of clutches the swinging or tilting mechanism may be thrown in or out of gear at will.

Connected with the hydraulic lift is a pressure gauge, showing the weight of the load and car both before and after unloading. By means of this pressure gauge the machine may at any time be used as a car scale. The machine is designed to lift the heaviest car-loads of coal or ore to a height of from twelve to fifteen feet (or higher if necessary) and discharge the same, in from five to seven minutes. Machines arranged for use in grain elevators unload cars in a still shorter time.

It is claimed by the proprietors that this device furnishes the cheapest and quickest known means for unloading cars. The idea of picking up a car loaded with coal or ore, and emptying it as one would a scuttle of coal, is novel and bold; but the thing seems entirely feasible by means of the machine above described, and it would seem that the problem as to how to unload the common, flat car cheaply and quickly, which has so long and seriously puzzled railroad men and engineers, is solved,

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SPARK AND CINDER ARRESTERS.—A correspondent of the *Boston Advertiser*, "F. W. M," writes under date of August 23d, as follows: "A paragraph in your issue of the 21st instant states that several attempts to abate the smoke and cinder nuisance on locomotives have been made by extending the tops of the smoke-stacks by means of pipes, making the point of emission the back end of the train, and points out the evident impracticability of the device. It is, perhaps, not generally known that this subject has received very careful attention and experiment on several of the railroads running out of this city. The Old Colony road has at this time some sixty locomotives equipped with spark-arresters and cinder chambers, which not only prevent the escape of any appreciable quantity of solid matter from the stack, but collects all the unconsumed products of combustion from the fire-box, which is afterwards prepared, by screening, for use under the stationary boilers at the company's shop. The device has been in use on this road for over two years, and is being applied as rapidly as possible on all the engines operated by the Old Colony. The Boston and Albany Railroad has also experimented for about six months with this innovation, which by the way is exceedingly simple and inexpensive in construction, and is used without detriment to the steaming qualities of the locomotive. Three of the spark-arresters, two on local trains and one on a through express, have proved highly efficient, and their use has given great satisfaction to the officers, employés and patrons of this corporation." To him the editor replies in the subjoined words: "Perhaps 'F. W. M.' misapprehends the purpose of the paragraph in question. It was not designed to throw any doubt on the practicability of devices—several of which have been noted in these columns—for lessening or abating the smoke and cinder nuisance, but only upon the particular mode in question—carrying smoke-pipes to the rear of the train—which up to date has not been successful."

Isaac N. Hoyt's Car-Coupling.

THE inventor of this improvement, who resides at Augusta, Wisconsin, has as his objects in its device, to construct a draw-bar or buffer in such a manner and with such a combination of parts, as to hold the link and pin in such position when the cars are uncoupled that they will couple themselves when brought together, and to permit of such another arrangement of parts as to prevent coupling if it is desired to push the cars, and yet leave them in position to couple the next time they are brought together.

The means adopted for the accomplishment of these ends are indicated briefly in the subjoined description.

The bar or buffer by which the freight cars are drawn, is in present practice provided with a recess in the outer end, which receives one end of a link. A hole is made vertically, through which a pin passes, as also through the interior of the link. The cars are attached by the link and the two pins. The cars when so attached have slack, to permit them to be started one at a time, and permits each car to sway sideways. To permit the necessary slack and sway, the link must be loose around the pin and fit loosely in the recess in the buffer. When the cars are to be coupled, it is necessary to direct the link to its position in the recess of the buffer, and when they meet to drop the pin through. To permit the slack and sway, and yet couple automatically, Mr. Hoyt constructs the buffer with a recess for the link and hole for the pin as at present constructed, but opening into the recess from the rear he makes a hole vertically through the buffer, the front and rear ends of which slant upward and backward. The sides of the hole run longitudinally with the buffer, and are a less distance apart than the width of the link. In this hole he places a weight, free to slide up and down in it, which, guided by the slanting ends, recedes as it rises and advances as it falls. It is provided with a jaw which, with the lower surface of the recess in the buffer, grasps the link immediately behind the pin. The weight has a slanting side, which, when the link and pin are both removed, and the weight is resting on the bottom of the recess in

the buffer, shuts partly over the upper hole for the pin and prevents the pin from falling through. To the upper side of the weight is attached a rod, having the same slant as the rear end of the weight, and forming a part of the weight. Over the hole in the buffer is placed a cap, sufficiently concave on its lower surface to permit the weight to rise until the lower edge of the jaw is as high as the upper surface of the recess in the buffer, but having a hole through which the rod may slide. To the pin is hinged a dog, near its upper end, of sufficient length to reach to the rod of weight when the pin rests in the upper hole in the buffer. When it is desired to couple two cars, the link is placed in the recess in the buffer of one. The link is held horizontal by the jaw of the weight resting on the end of the link back of the pin. The other car-buffer is left with the weight down, and the pin in the upper part of the hole, retained there by the face of the weight. When the cars meet, the link enters the recess in the buffer and pushes the weight backward and upward, releasing the pin, which falls through the link. Sometimes it is desired to push a car to some point and leave it, and also to leave it in position to couple on again. This is accomplished by the dog attached to the pin, and the rod of the weight. The pin on the car to be pushed is raised out of the link and the foot of the dog placed against the rod. The weight may then be raised and lowered above the link without disengaging the pin; but if the link be removed, the weight falls to the bottom of the recess in the buffer, carrying the rod below the top of a plate, disengaging the dog, but retaining the pin by the face in position to couple.

Mr. Hoyt claims that his coupling is almost inexpensive, while effective, simple and durable.

The Post Refrigerator.

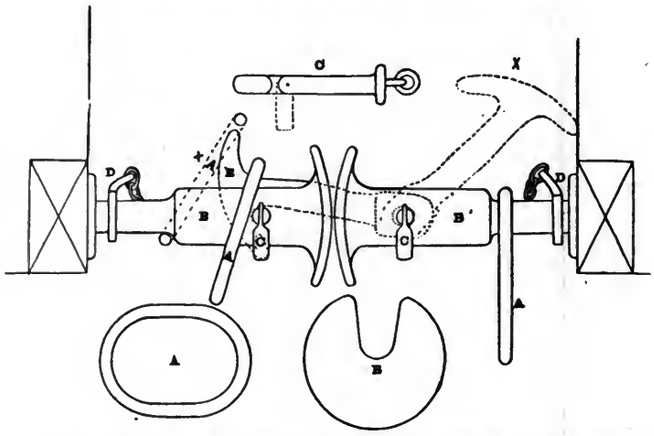


THIS invention is found to answer the two purposes of saving time and preserving its contents without injury throughout the longest railroad journey. It is supplied in three different forms, by The Post Refrigerator Car Company, of Boston. At the recent Exposition of Railway Appliances, held in Chicago, it attracted great attention, and the peculiarities of its construction were greatly admired. The first form of the Post Refrigerator is intended for use in the transportation of fresh beef, fish, etc. Its cooling surfaces are exceptionally large, and it contains provision for regulating the temperature of the dry and cool air which freely circulates within it. This form of car utilizes the pickle, which is retained in a tank at the bottom, between the two ice tanks. In the second form the ice tanks are at the top, giving large space for eggs, fruits, butter, etc., in the body of the car. The racks made by The Post Refrigerator Car Company for loading cars of this style are a highly ingenious and useful invention, saving much time and labor. The remaining form of car is divided into sections, and consists of a row of circular tanks sixteen inches in diameter, with a three-inch air space inclosed again. It is well adapted for the local transportation of perishable goods. In all three forms the cooling mixture used is composed of salt and crushed ice. We learn that the Post cars are clean and dry on their interior surface.

The company contracts to furnish cars, either on mileage rates or on yearly royalties, for the transportation of perishable goods for any distance. Inquiries should be addressed to Robert H. Waters, General Manager, "The Post Refrigerator Car Company," Boston, Massachusetts.

The company is also prepared to furnish estimates for the erection of coolers, under their various patents.

An Effective Car-Coupling Used in Chili.



HEREWITH is the sketch of a car-coupling in use some years on the Autofajasta road, Chili, on nearly eight hundred cars and coaches, without causing a single accident. The cars on arrival lacked A, C and D, and it was found that any slight bunching up of the train when in motion, was sufficient to uncouple the cars. The oval link was tried and turned out a complete success. It is impossible for the hook to rise sufficiently to clear the coupling-pin while the oval link remains on the draw-head, and it is only by moving it back to the neck of the draw-bar that it can clear the point, as is shown by the dotted lines at X, I, showing the oval link being lifted and drawn back, preparatory to uncoupling the cars. This arrangement is interchangeable, both ends of cars being alike, as also of engines. The next thing invented was the drop-link C, as the ones supplied with cars were continually working out to which was added the fastening to the loose ring D, by a small chain. When E is left in the position X, any slight shock caused by the engine backing, is sufficient to cause the hook to drop into its place. The oval link is then passed over and all is safe.

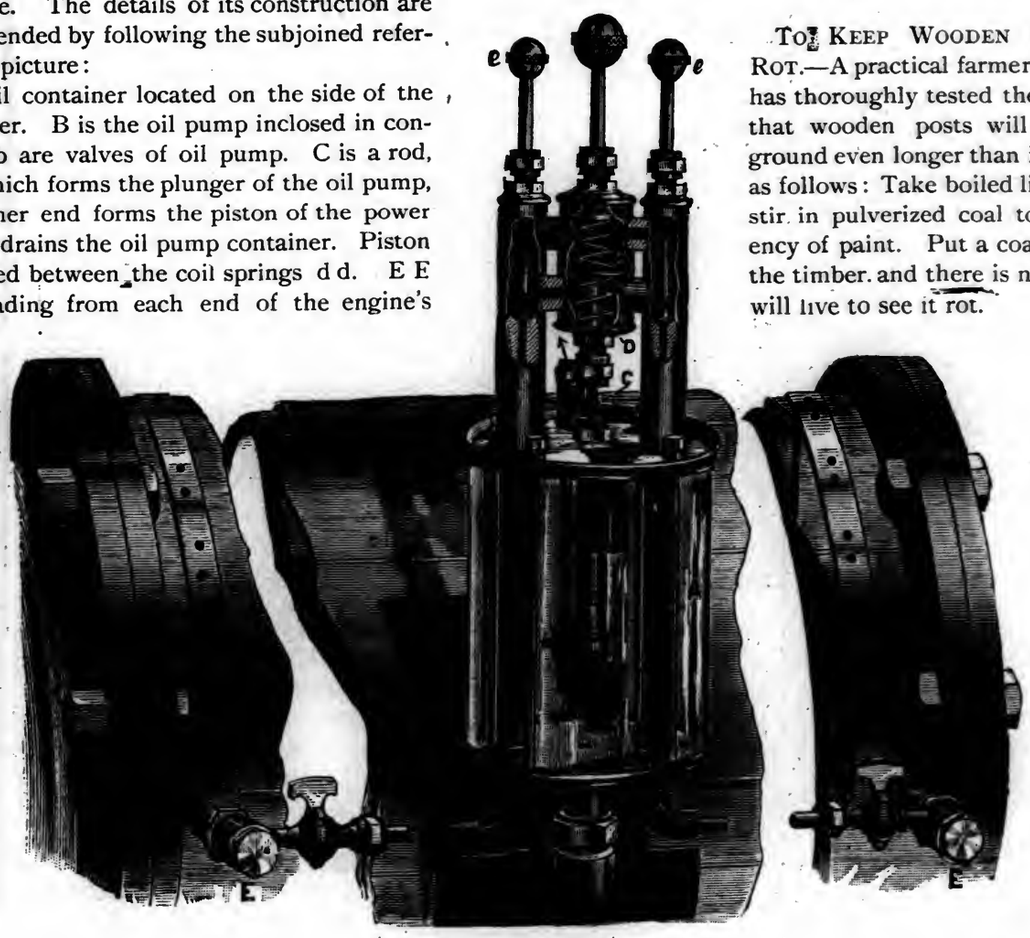
IN Maryland at a somewhat earlier period (than 1797), we find an advertisement in the *Maryland Gazette* of a servant who offers himself "to wait on table, curry horses, clean knives, boots and shoes, lay a table, shave, and dress wigs, carry a lantern, and talk French; is as honest as the times will admit, and as sober as can be."—*Harper's Magazine.*

The Forest City Lubricator.

ACCOMPANYING is an engraving of this valuable invention, patented July 10th, 1883, by W. W. Brisben, of Cleveland, Ohio, who has had an experience of fifteen years with the leading iron and steel companies of that city. The Forest City Lubricator is said to be a solution of the problem of automatic lubrication, being in successful operation on some of the first engines in Cleveland, and elsewhere. The details of its construction are easily apprehended by following the subjoined references to the picture:

A is the oil container located on the side of the engine cylinder. B is the oil pump inclosed in container A. b b are valves of oil pump. C is a rod, one end of which forms the plunger of the oil pump, while the other end forms the piston of the power cylinder that drains the oil pump container. Piston C is suspended between the coil springs d d. E E are pipes leading from each end of the engine's cylinder to the power cylinder of the lubricator connecting one with the top and one with the bottom; thus the valves of the engine operate on the piston head in the lubricator cylinder the same as they operate on the piston in the engine's cylinder. e e are valves for regulating the pressure and regulating the length of stroke by the action of the governors of the engine. The pressure of steam in the cylinder is increased or diminished according to the load carried. This same change in the pressure of steam will be had in the power cylinder of the lubricator and will vary the stroke of the oil pump accordingly.

Among the advantages of Mr. Brisben's invention are: It starts when the engine starts, stops when the engine stops, and will increase and decrease the supply of oil according to the load that the engine is pulling. Thus, if the lubricator should be set so that it would just supply the wants of an engine running light, any additional work thrown on the engine would increase the length of the stroke of the oil pump, and also increase the flow of oil accordingly. This lubricator is recommended because it will take care of the valves and cylinder of an engine; for if a valve needs oil at all, it is when doing its hardest work, and the amount of oil that would supply a valve working light is not enough to protect it from injury when the engine is doing hard work. It will readily be seen that it is a perfect economizer, from the fact that it is not necessary to feed a surplus of oil while working light, to make up for the amount needed when the pull is hard.



THE FOREST CITY LUBRICATOR.

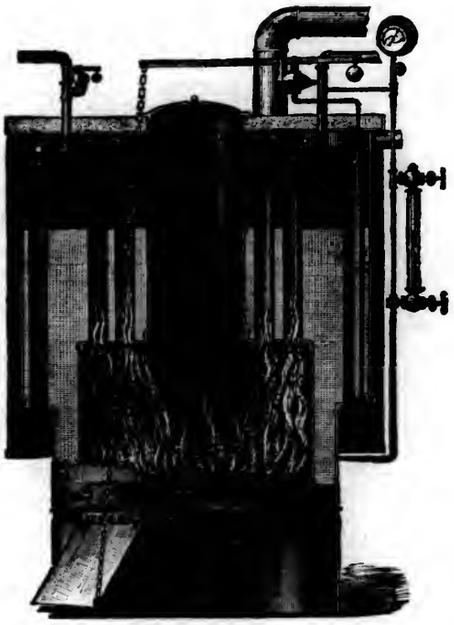
TO KEEP WOODEN POSTS FROM ROT.—A practical farmer, and one who has thoroughly tested the matter, says that wooden posts will last in the ground even longer than iron if treated as follows: Take boiled linseed oil and stir in pulverized coal to the consistency of paint. Put a coat of this over the timber, and there is not a man that will live to see it rot.

A NEW STYLE OF SLEEPERS.—It is stated by the New York *Tribune* that the Boston and Albany, and the New York, New Haven and Hartford railroads are to put boudoir sleeping-cars on their express line between Boston and New York after October 1. These cars, according to the description, are radically different from any sleepers in use in this country, though they have been in general use on the Continent of Europe for some years. Instead of "sections" lengthwise of the car, there are a series of state-rooms or "boudoirs" opening off a corridor along one side of the car. Each of these boudoirs has one or two sofas, transverse of the car, the backs of which lift up and form the upper berth, while the seat forms the lower. Vestibules at either end of the car provide ample toilet and heating, or cooling facilities, and the ventilation is said to be perfect.

WHAT never ran smooth yet, can hardly be expected to change its character for us; so we must take it as we find it, and fashion it into the very best shape we can by patience and good-humor.

Gorton's House Heating Steam Generator.

THE Gorton Boiler Manufacturing Company, (Limited), No. 110 Centre street, New York, find that the steam generator illustrated and explained in this article, and in operation in numerous buildings, gives great satisfaction, because simple in construction, base burning, durable and economical, and efficient and pleasant in use.



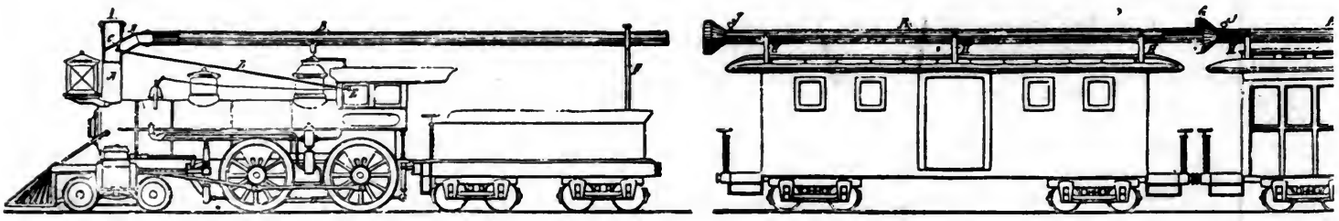
The boiler shown in the cut is No. 2, and represents the use of vertical tubes surrounding the magazine or coal reservoir and above the fire, so that the heat passes up through these tubes and down through the outer tubes and thence up between the outer shell of the large boiler and jacket, to the smoke pipe.

The Gorton boilers are base burning and self feeding. They are furnished with a non-conducting galvanized iron jacket, and no brick or mason work is required in setting. The iron jacket envelops the boiler, confining the heat to generate steam, instead of wasting fuel to heat brick mason work. The door opens into the fire at the grate, so that the fire can be seen and any clinkers readily raked off. The cast-iron top or cover to boiler is made in sections, so that parts of it can be removed without disturbing boiler or attachments, in order that the interior of boiler and flues can be readily reached for any purpose. All or any of the improved attachments used on boilers for convenience or safety, can be used with these boilers. The coal reservoirs are ample to hold coal for from twelve to twenty-four hours' use, and they will keep up steady continuous heat without care of fire or shaking of grate more than twice during each twenty-four hours. The entire surfaces of the boilers and tubes are utilized, the heat passing around and between the boilers and through the tubes to every part.

Cotter's Spark Arrester and Conductor.

COTTER'S spark and smoke arresting and conducting system for railway passenger trains, is described as fully as we can afford space in the next paragraph. There is no difficulty in understanding it; the letter-press being accompanied by a neat illustration. Readers are referred to J. A. Cotter & Co., Saginaw, Michigan, for particulars as to the cost of its adoption, recommendations and other additional matters pertinent to the consideration of its merits as a practicable improvement.

A A in the cut illustrates the cast iron smoke stack and elbow, in two pieces, one foot square, the elbow at the end to be round to receive, and on which conducting pipe B fits a little loose, to allow for any oscillation there may be on elbow A, while running, said conducting pipe B, being fastened to elbow A, by one bolt. B B B, conducting pipes, ten inches. C, damper for turning sparks and smoke through conducting pipe B, while running forward. D, rod to operate damper C, from the cab. E, collar and thumbscrew to hold damper C in the desired position. F swinging swivel hanger, to hold up the rear end of locomotive conducting pipe, running from each side of the tender to the necessary height. I, wire netting to prevent sparks from escaping when running backward. G, receiver twenty-four inches in diameter, movable, to be inserted in the front end of all conducting pipes, over all coaches as shown, to allow a free motion of the end of conducting pipe B, entering it, which receives the escaping cinders and smoke, and also a strong current of air to further assist in forcing the same through the pipes to the rear end of the train; the receiver to cover the end of conducting pipe B, about two inches. J, thumbscrew to hold the receiver in position. On freight locomotives the receiver is placed a little back of the cab, stationary, to give additional draft.



COTTER'S SPARK ARRESTER AND CONDUCTOR.

A GERMAN technological journal points out the fact that a vast amount of valuable steel is lost every year in the shape of pens, that become unfit for writing and are thrown away. Pens are made of the very finest steel, and can be remelted and used again for many purposes. They can be turned into watch springs and knife blades, and can be dissolved and made available in the manufacture of ink. The suggestion is made that the children of the poor should be taught to collect cast-away pens, and thereby save valuable material and earn money.

Stearns's Self-Adjusting Car Axle-Box.

A VALUABLE INVENTION FOR THE COMFORT OF THE TRAVELING PUBLIC—NO HOT BOXES—NO SHOCKS IN TURNING CURVES —ECONOMY ALSO FOR THE COMPANIES.

THE object of this invention is to prevent the lateral binding of car axles in their bearings, by providing efficient means for retaining the journal always in exact line with the bearing in which it works, irrespective of any twist, torsion, or displacement which may ordinarily be brought to bear upon the housing or shell of the journal-box, which, with the *ordinary boxes*, occurs in *turning or rounding curves*, and which from the inordinate friction produced, results not only in the *heating of the journal*, but also in a *large consumption of lubricating material*, the *rapid wearing of the bearings*, and the *straining of the journals and adjacent parts*.

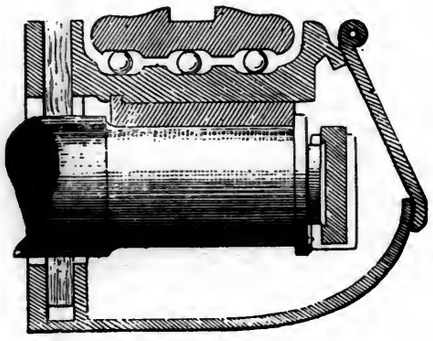


FIG. 1.

Fig. 1, as above, represents a central vertical sectional view of the invention, taken in a plane coincident with the axis of the journal.

Fig. 2 is a plan view of the housing which forms part of the apparatus.

Fig. 3 is a front view and partial transverse section, the front portion of said view being that of the pedestal and equalizing bar.

Fig. 4 is an inverted plan view of the saddle which forms part of said apparatus.

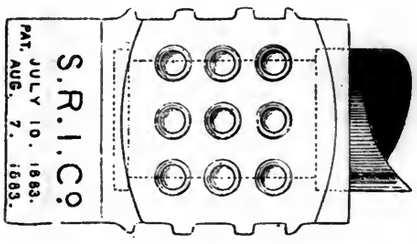


FIG. 2.

The housing or shell of the axle-box may be of the usual or any suitable configuration, except that at its top it is chambered out or hollowed; the bottom of this chamber, however, being substantially flat, and having formed in it cavities corresponding with cavities formed also in the saddle, (see illustrations) between which are interposed chilled iron balls one and one-half inches in diameter, which are so arranged as to keep the saddle out of contact with the chamber, and any weight placed thereon will be borne by them, and the pressure of such weight transmitted through to the top of the housing, and thence to the bearing resting upon the journal, thus keeping the bearing exactly in line with the journal, and consequently in a position affording the smoothest and most perfect contact therewith, thereby *avoiding all undue wearing*, *heating*, *abrasion*, and other results of inordinate friction, and preventing when turning a curve in a track that lateral twist or wrenching which is experienced when the parts are rigidly affixed.

A great advantage in this improvement is that it can be applied in connection with the old pedestals, and with any of the usual or known forms of truck; and to *freight cars* without any truck; the expense being mainly that of a new housing or shell, and the simple castings used in connection therewith.

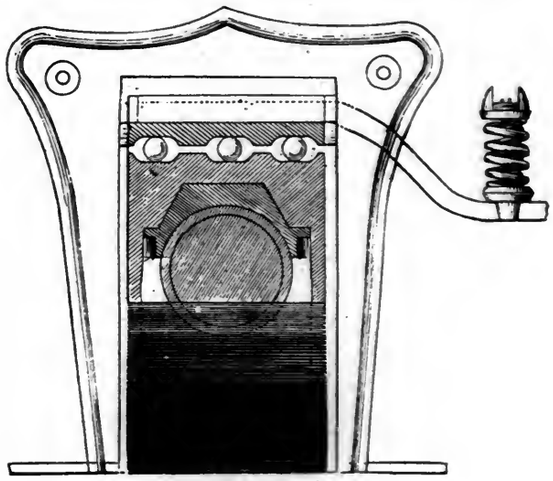


FIG. 3.

The claims made for this box are as follows:

1. A saving of from 50 to 75 per cent. in the running expenses of each individual journal.
2. A doing away with hot boxes.
3. A saving of wheel, rail, brass and journal.
4. A higher rate of speed with absolute safety.
5. An increase of one-third in motor power by the overcoming of friction to that amount.
6. No lateral motion perceptible whether on a straight line or curve.

This box has been in actual operation on several leading roads for nearly two years past, and has demonstrated thoroughly that the above claims can be relied on; and all recommend it as achieving the result long sought, and the simplest and best box ever invented; and negotiations are now pending for its final adoption. * * *

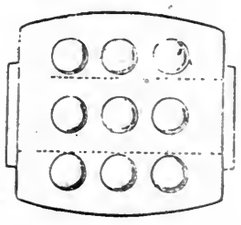


FIG. 4.

In making inquiries upon the matter of the preceding references to the Stearns Patent, a representative of the AMERICAN RAILROAD JOURNAL had interviews with O. S. Stearns, Esq., the patentee, and President of the company owning the invention. Every facility was extended and closest investigation invited. At the office, 176 Broadway, a large working model was shown. Practical

railroad men heartily indorsed the appliance in the strongest terms. There is no rational doubt that its general use will largely contribute to the comfort of passenger travel, while at the same time saving a very considerable percentage of expense, in the lessened strain upon locomotives and cars, and in friction upon rails and journal-bearings.

The company will, upon application, equip a car upon any line, at their own expense, for trial tests, and railroad managers are invited to make the most thorough tests possible.

When it is considered that the expense of the application is so trivial, either to the most approved patterns of passenger railway coaches, or to freight cars, or to the ordinary tramway or horse-cars, and also that the guaranteed results attainable are so favorable in financial aspect for the expense department of railroads, while securing increased comfort to an exacting public, it may be safely predicted that the new system will be universally adopted.

We will quote from a few of the statements made by railroad men who have been testing the box. The originals of documents from which these extracts are made may be seen at the office, 176 Broadway, New York.

One official writes:—

"I send you by express this P. M., two bearings; one was run with your box two months, and the other under opposite end of car, three weeks with old-style box, and weighs four pounds and fourteen ounces; while the other (in your box) weighs just seven pounds. They speak for themselves. The car travels over 200 miles daily. The bearing in your box run 12,084 miles; that in the old-style box 3,420 miles. Original weights same."

Another official writes:—

"April 9, 1883, I applied under one end of mail car the Stearns Self-Adjusting Axle-Box, and find the following results: The Boxes have run cool, and have not been obliged to remove bearings during the time. The box also prevents the bearings from cutting on collar of journal, and I also find the box keeps the flange of wheel from becoming sharp, which is a great improvement over the old style of boxes. I have inspected these new boxes daily and found that the outside plate of wheels becomes greasy and dirty from the start, while on the other end of the car the wheels were kept bright on account of their coming in contact with the wheel beam. This shows that the new boxes prevent the flange of the wheel from cutting or becoming sharp, which is a great saving over the old-style boxes. Since I applied the new boxes, it has become necessary to remove the bearings on the other end of the car two different times. I consider the new boxes an improvement on the old style of journal boxes and will save the flanges and bearings, and do away with a greal deal of friction."

A conductor writes:—

"I have run car equipped with Stearns's Self-Adjusting Car Axle-Box for the past eight months, and running daily 150 miles, and can safely say that the said car gave me no trouble in any way, shape or manner. Neither was the car taken off for repairs during the time I ran it. It is all that is claimed—no hot boxes; riding easier; saving of bearings, wheel and rail."

The following, which is signed in the original by several railway-mail agents on a prominent railroad, is worthy of consideration as illustrating the claim that the use of the appliance conduces to the ease of occupants of cars in travel. These officials write:

"The Stearns Axle-Box has been in use nearly two months under end of car in which we distribute and handle the mail matter daily, and we find as a result, our end of the car rides much easier than formerly and without any lateral motion. The change enables us to stand in the mail room, directly over the truck, and assort mail matter easily while going round curves. This was almost impossible with the old-style box."

The officers of the company are: Oscar S. Stearns, President; J. Sanford Potter, Secretary. Communications are invited, and will receive prompt attention. Address Stearns Railway Improvement Company, 176 Broadway, New York.

SPECIMEN copies of the JOURNAL sent free.

A Self-Closing Oil Can.



Messrs. JACKSON, DAILEY & CO., of Sharpsville, Penn., manufacture a patent self-closing engine oiler, of which we proceed to give a short description. Accompanying is a picture of the oil can, which is much liked and used quite extensively.

In the self-closing can is a valve applied to the spout, and the supply of oil through this valve is regulated by means of the thumb-piece above the handle of the can. The valve is always closed except when pressure is applied at the thumb-piece. Obviously the flow of oil being absolutely under regulation, all waste is prevented.

Among the many who use this simple and economical device are several railroads. It is adapted to all purposes requiring the use of an oil can, and ought to be made as widely known as possible.

Important Facts for American Manufacturers and Importers.

THE Australian colonies import over $400,000,000 annually. The United States have but $14,000,000 of this vast trade, yet it is a positive fact that American manufactures are greatly preferred over those of other countries. American hardware generally, tools of all kinds, machinery, agricultural implements, safes, building materials, sewing machines, stoves, furniture, carriages, clocks, lamps and glassware, kerosene oil, canned goods, tobacco, timber, flooring, roofing material, drugs, dental goods, etc., are much preferred over those of English make, though the colonial merchants have heretofore bought nearly all their American goods in London. The population of Australia are English speaking people, doing business upon our own methods and systems; correspondence and business transactions with them are simple. Few people, when they think or speak of the Australian colonies, know that they contain 3,111,937 square miles of territory, nearly two thousand millions of acres, for the most part fertile land. The population is about 5,000,000. In the season of 1880-'81 no less than 8,371,238 acres were cultivated. The production of wheat amounted to 50,346,950 bushels; oats, 25, 766,875 bushels; barley, 5,506,191 bushels; corn, 9,335,239 bushels, and 1,723,587 bushels of other cereals. Potatoes raised, 724,-155 tons, or 24,138,500 bushels; of hay, 1,561,158 tons; 2,171,861 gallons of wine were vintaged. The mean average of the wheat crop for Australia was 12.40 bushels, and for Australasia, 15.25 bushels. Of live stock there were 1,465,655 horses, 9,878,782 cattle, 70,915,765 sheep, and 522,337 pigs, making a total of about 90,000,000 head of live stock. These figures show plainly the great advantages to be derived by establishing direct trade relations with that country, and though comparatively small at first, the trade is bound to grow as population increases. —*Australasian.*

THE Chesapeake and Ohio is to enter Cincinnati, crossing into that city over the Kentucky Central, that is if the practical consideration of this improvement shall result in

action, which, we learn, is probable. A local paper reports that the Chesapeake and Ohio has been laboring under a great disadvantage for want of proper connections with Cincinnati, or at least a terminus in that city, as at present all freight and passengers for that road going either east to the seaboard or southwest to Memphis from that point are obliged to leave over the Kentucky Central from Covington, and the transfer that it is necessary to make is, of course, disadvantageous, especially so in the matter of freight. When the movement which is now on foot is consummated, the Chesapeake and Ohio will be independent, and an active competitor in the market for traffic for the seaboard organization in the North, Northwest and West, which can then be transported to the ocean at Newport News, as good a point as there is on the coast for making European shipments, and much nearer to Cincinnati than is New York. Also of special interest to Cincinnati is the fact that Mr. Huntington has been negotiating with the Ohio Central for a lease of that road from Charleston, on the Chesapeake and Ohio, to Point Pleasant—or, rather, a point opposite, on the Ohio side of the river—including the use of the bridge which is now under course of construction and will soon be finished. The channel span, upon which work is about to be begun, will complete the structure. The directors of the Ohio Central will hold a meeting in a short time and consider the propriety of leasing the road and bridge to the Chesapeake and Ohio. It is stated that no opposition will be made by any of the directors to the proposed lease. After getting across the river, Mr. Huntington's plan is to build a piece of road to Portsmouth, a distance of about fifty miles from that point, on into the Queen City. All will be easy, as the scheme is to purchase or lease the Cincinnati and Eastern and change it to a standard gauge. The latter road is now completed to Henley, within eighteen miles of Portsmouth, and will reach that point by the first of October. From Newport to Portsmouth, all that will be necessary will be to change the iron, as the grading, etc., has all been done with a view to making the road a standard gauge. At the Cincinnati end of the road, preparations have also been in progress, all new ties that are put in being eight feet. The Cincinnati and Eastern at present comes into the city from Idlewild, three miles over the Cincinnati Northern tracks, but an arrangement has been made for an entrance at the Cincinnati end.

[Advertisement.]

The Varnish Trade in the United States.

GREAT care has been taken in the preparation of this article, that its statements should be absolutely accurate; and it may be relied upon as giving a correct account of the origin and developments of the varnish trade in the United States. Its value as such is obvious to every reader.

ENGLISH VARNISH IN AMERICA.

The late John R. Lawrence, of New York, noted in his day for unusual enterprise, was the first American carriage-builder who used English varnish. He had then been in the business about forty-three years, and it was about the year 1835, when the firm was Lawrence & Collis, that he made the first importation of varnish from Great Britain.

At that time, all carriages made in this country were polished in a manner very similar to the present mode of polishing pianos. English carriages were then frequently imported, and Mr. Lawrence had often studied the appearance of their finish, and wondered how it was produced. The great trouble with the polished carriages was the readiness with which they spotted and discolored when exposed to moisture. A wealthy citizen of New York and a good customer of Mr. Lawrence, had ordered of him a fine coach, but complained that it changed color badly. Mr. Lawrence visited his coach-house, and finding it very damp, assured the gentleman that any varnish would perish when exposed to so damp an atmosphere. "But not so readily," answered the other, and he then showed an English coach which had been stored in the same room for many months, and whose appearance was decidedly more lustrous than that of the new one.

The above incident led Mr. Lawrence to look thoroughly into the subject, and he determined to obtain and test some of that English varnish if possible. He wrote to a business acquaintance in London, and through him received a sample ten-gallon lot in 1835. At the time of receiving it, he had with him an employé who had formerly worked in a London carriage shop, and this man was called upon to give suggestions about using the new varnish. He represented that it was polished in the same manner as in America, so a heavy coat was applied, and the men waited patiently for it to dry. At the end of a week it had scarcely begun to do this. A month passed by, and then an attempt was made to rub it, but the painters found this impracticable. At the end of three months the attempt was again made, but again failed signally; and the painters were disposed to curse the new varnish as a humbug and a swindle.

During these three months, the vehicle had been run out into the sun every pleasant day, and every possible pains had been taken. Three months more elapsed, but without any further progress. It then happened that one day, while Mr. Lawrence was examining the varnish on the English carriage, and trying to solve the mystery of its application, that in scrutinizing the arch panel, which was just opposite a window and exposed to a strong light, he noticed what he thought were brush marks on the surface. He called his varnisher, and between them and the brush-marks it was decided that this surface must have been finished without polishing. Here was an important fact brought to light, and they hastened to reduce this new knowledge to practice. The coach previously spoken of was given another thin coat of the English varnish, which worked without much trouble, as the first coat had been often rubbed down; and although not so easily accomplished nor so satisfactory as later jobs, this first experiment with imported varnish was decided to be a success, and Mr. Lawrence thereafter continued its use. Mr. Wm. B. Crosby, then a prominent New York citizen, became the possessor of this first American carriage finished with English varnish.

For several years the firm of Lawrence & Collis kept their method of finishing a secret, importing privately from London, and paying a round price of from fifteen to eighteen dollars per gallon. Within a few years afterwards, other carriage-builders began to try the English article, generally through the recommendation of painters who had used it in the old country. It met with much opposition at first, but one by one the leaders of the trade became converts, until about 1852, when an agency for its sale was opened in New York; and

that year is generally mentioned as the date of its introduction.

Such is the history of the introduction of English *flowing* varnish in this country, in place of the *polishing* varnish that had before that time been exclusively used. For nearly twenty years afterward, or until 1870, it stood unrivaled in this country and throughout the world; and although no adequate explanation could be offered why American manufacturers of varnish should not be able to equal the imported, they signally failed in their attempts to do so, and painters generally had settled down in the opinion that England alone could make finishing varnish. In 1870, however, a rival appeared in the now celebrated "Valentine varnish," which after thorough tests and gradual adoption by many of the leading coach and car-builders, was first admitted to fulfill its claim of "equality with the best English," and was afterwards announced better adapted for general use, inasmuch as it was lighter in color, easier working under the brush, safer as regards results, and not so liable to spot and discolor. Armed with these valuable qualities it was soon successful, not only in supplanting the imported article in America, but in gaining an important trade in England, and throughout the carriage centers of the world, where it is now looked upon as "the standard of uniformity and excellence."

FIRST AMERICAN VARNISH FACTORY.

In 1820, Franklin Houghton, in company with David McClure, made varnish in Cambridge, Mass. Their shop was the back part of the blacksmith shop of Dexter Pratt, situated on the road leading to Mount Auburn. This was in the vicinity of Longfellow's late home, and it was upon this very shop that he wrote his well-known poem, "The Village Blacksmith," which begins with the familiar lines, "Under the spreading chestnut tree, the village smithy stands," etc. This shop remained standing until 1865, when it was burned.

In the back part of this building, Messrs. Houghton & McClure inaugurated the business of varnish making for the trade. A kettle holding about eight gallons was used, and as fast as made the varnish was taken to Boston and sold to the carriage-builders. They did well at the business, finding a ready sale for all they could supply. It is said that they realized a dollar an hour apiece for working hours, which was considered capital pay in those times. The business increased to such a degree that they afterward removed to a new shop which they built in the vicinity of Boston, where the business still continued to prosper. Houghton retired on account of impaired health, thought to have been caused by inhaling the varnish fumes; and McClure, for the same reason relinquished the business in 1827, after having realized a competency therefrom.

Pike & Samuel Shedd had made varnish for the Boston carriage-makers many years before the starting of Houghton & McClure, but the former had merely gone from shop to shop when occasion required, and assisted in making the varnish in each, the materials being supplied them by the carriage-builders; whereas Houghton & McClure manufactured and sold upon their own responsibility.

The business now represented by Valentine & Co., established in Boston in 1832, was practically a continuation of that relinquished by McClure, as they immediately succeeded to the trade he had established.

VALENTINE & CO.

The business of varnish making now carried on by the Messrs. Valentine & Co. in New York, was first founded by that house in Boston, Mass., in 1832, with their factory at Riverside, a suburb of Cambridge. In 1870 they became assured that they had at last attained a result which had long been their aim, and on Oct. 15th of that year, they first published the announcement, "We claim that our varnishes are fully equal to the best imported!"

About the same time they became interested in the Piotrowski "wood filling," as manufacturers and agents, an article for permanently filling the pores of wood previous to painting, which, under their enterprising supervision, was widely introduced, and resulted in a complete revolution of the method of painting previously practiced by carriage and car-builders, and which proved a great boon to those trades, by reducing the time and expense incurred in the process of painting, and rendering the result more satisfactory and more permanent.

In the following year they removed their main office to New York, and their factory to Brooklyn, where they still remain, while they have since established branches in Boston, Chicago, London and Paris.

The present company, retaining the old firm name of Valentine & Co., was incorporated in January, 1882.



THE LEWIS & FOWLER
IMPROVED ALARM
PASSENGER
REGISTER
AWARDED THE
FIRST PRIZE MEDAL
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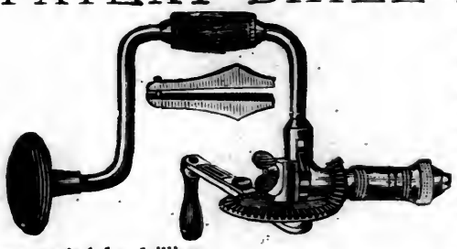
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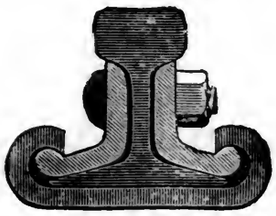
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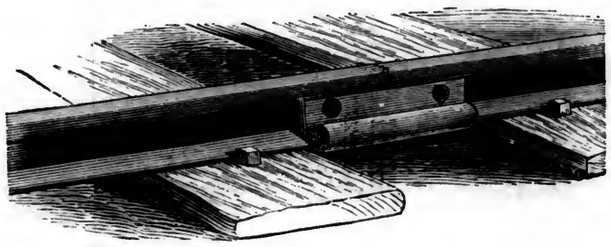
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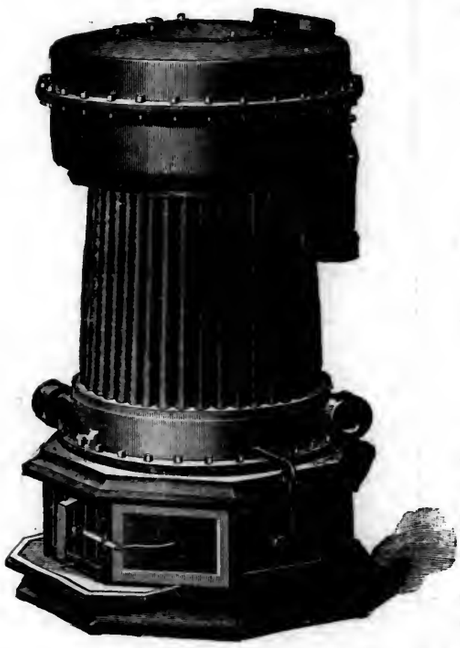
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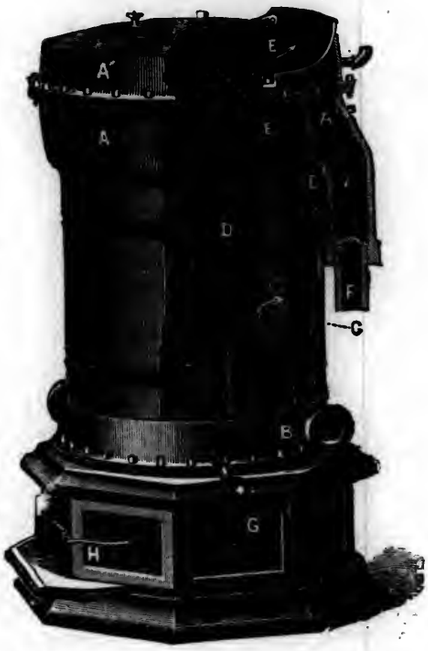
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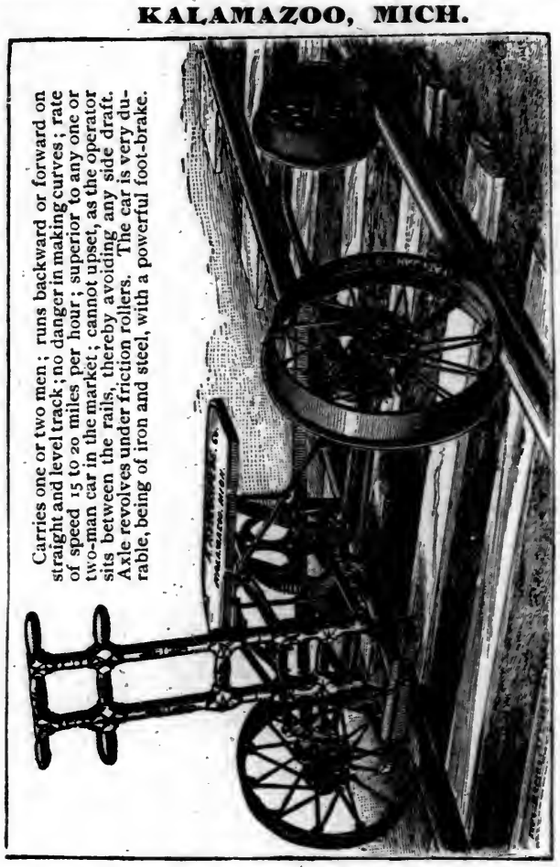
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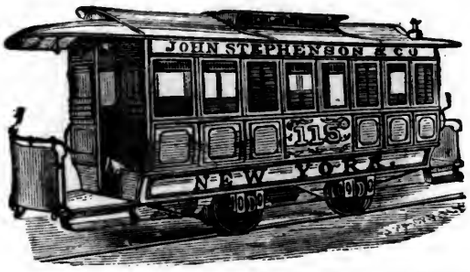
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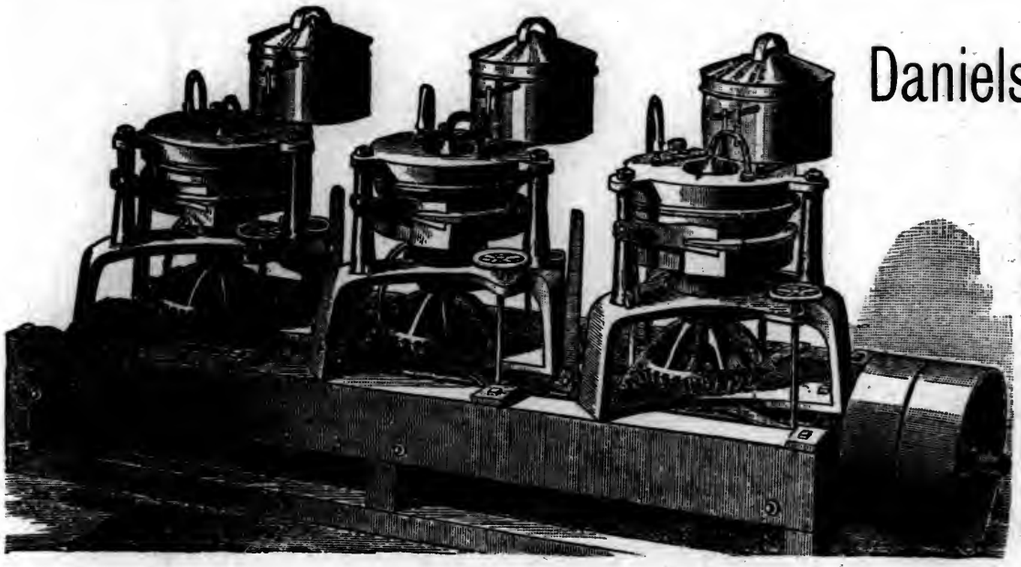
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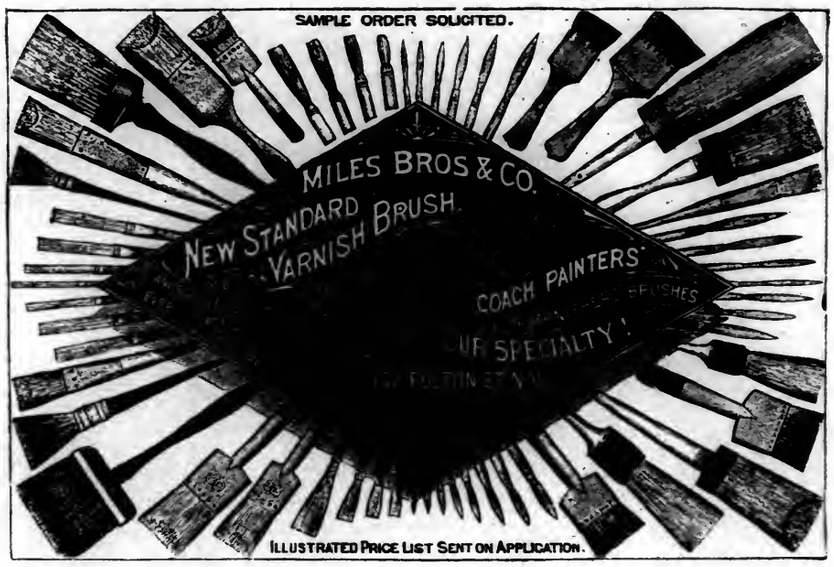
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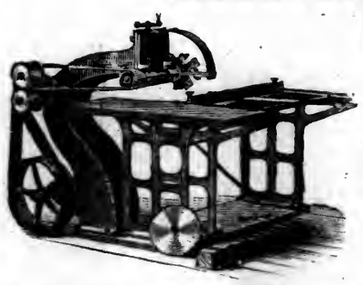
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·ESTABLISHED·1831·

Railroads, Tramways, Finance, New Inventions, Machinery.

WHOLE NO. 2,545.] NEW YORK, OCTOBER, 1883. [VOLUME LVII.—NO. 7.

Railroad Notes.

WE invite railroad officers to send us notice of elections, transfers, appointments, resignations, etc.; and all our readers would oblige us by furnishing us with any items of news which may come to their knowledge and are of a suitable nature for our columns. It is our intention to publish monthly full and accurate information regarding those enterprises and industries to which the AMERICAN RAILROAD JOURNAL is devoted, and to effect this end we solicit the coöperation of readers interested therein. We aim specially to record all new railway enterprises in the United States and Canada, and to note the progress of construction on all new roads and extensions; and we request those concerned in railway building to give us early information concerning the above, that our reports may be as complete as possible.

L. S. DANIEL has succeeded W. H. Munro, as trainmaster and station agent at Victoria, Texas, on the New York, Texas and Mexican Railway.

THE earnings of the Chicago and Grand Trunk Railway for the week ending September 29, show an increase of $14,795 over the corresponding week last year, and an aggregate increase in thirty-nine weeks of $577,090.

NEW CASTLE AND NORTHERN RAILWAY.—It is understood that the contract for the completion of the New Castle and Northern Railway, a part of the Erie system, is concluded. The road will connect with twenty-one furnaces, and is regarded as a valuable piece of railroad. The grading is more than half completed, and the entire line will be finished and in operation in about three months. Pittsburgh will then have another connection with the lakes.

THE Pennsylvania Railroad reports that the quantity of coal and coke carried over its lines for the week ending September 29, was 251,803 tons, of which 194,405 tons were coal and 57,398 tons coke. Of this weekly tonnage 181,262 tons originated on the main line of the Pennsylvania Railroad, while the remainder originated on its branch lines. The total tonnage for the year thus far has been 8,881,364 tons, of which 6,568,011 tons were coal and 2,313,353 coke. These figures embrace all the coal and coke carried over the road, east and west.

A NEW ROUTE TO THE PACIFIC COAST.—Captain C. W. Rogers, vice-president and general manager of the St. Louis and San Francisco Railroad, who has just returned from the Pacific coast, announces that arrangements are completed to open the Atlantic and Pacific road from Albuquerque to Colorado river on the 21st inst. From that date, through Pullman sleepers will be run from St. Louis to San Francisco over the St. Louis and San Francisco line to Halstead, Kan., thence over the Atchison, Topeka and Santa Fé to Albuquerque, then over the Atlantic and Pacific to the Needles on the Colorado river, thence to San Francisco by the Southern Pacific. Through sleepers will also be run from Kansas City by the Atchison, Topeka and Santa Fé to Albuquerque, thence by the Atlantic and Pacific and Southern Pacific to San Francisco. Through sleepers will also leave San Francisco at the same time and come East over the same routes. The distance from St. Louis to San Francisco by this new route is 2,440, or 250 miles shorter than that via Deming, and will be run in twelve hours' quicker time. The entire line is in first-class order, and is expected to become very popular, especially in the winter, on account of the mild temperature of the country through which it passes.

DENTON, MD., Oct. 15.—D. C. Hudson and Charles Powell will to-day resume the survey of the proposed route of the Maryland and Atlantic Railroad, beginning at Denton on the west side of the Choptank, and if possible make a direct line to Queenstown, touching at Hillsboro. The running of the line was postponed by the surveyors in July last, owing to the difficulty in crossing fields of growing corn. The entire route from Lewes to Kent Island will cross but one stream at a navigable point and that is the Choptank at Denton. Tuckahoe creek, which is the next largest stream to be spanned, will be bridged above navigation. Chief Engineer Mapes is expected in Denton to-day on business in connection with the survey.—*Every Evening*, Wilmington.

THE first public experiment on an extended scale in America of an electric locomotive will be tried on November 10. Vice-President Arkell, of the Saratoga and Mount Magregor Railroad, will try to run a train of two cars from Saratoga to Mount Magregor on that day with a daft motor.

THE Michigan Central Railroad Company, which at first voted against the adoption of the uniform time schedule adopted by the railroads of the country, has signified its intention to conform to the new rule.

OCTOBER 23.—American Association of Railroad Superintendents will be held at Washington, D. C., October 23.

THE twentieth annual convention of the International Brotherhood of Locomotive Engineers of the United States and Canadas was opened in Buffalo, N. Y., on the 17th inst. with a large attendance. Mayor Manning, in welcoming the convention, declared that the engineers of the commonwealth form no small part of the progress of the nation's life. Mr. Arthur, Grand Chief Engineer of the order, delivered the annual address, in which he recited the advantages of the order. On the subject of strikes he said the best method to settle the difficulties that arise between the employer and the employé is for the representatives of both sides to come together and talk them over in a friendly spirit, each one making concessions, whenever the nature of the case would seem to warrant it. This has always been the policy of the brotherhood, and they have never failed in effecting a satisfactory adjustment of the differences when met by the officers.

THE Southern Time Convention was held at No. 46 Bond street, New York, on the 17th inst. R. R. Bridgers, the president of the Wilmington and Weldon and the Wilmington, Columbia and Augusta Railroads, was in the chair. Thirty-four roads were represented. The new standard system of time devised by Mr. F. W. Allen was adopted on the motion of Major E. T. D. Myers, of the Richmond, Fredericksburg and Potomac Railroad. It was determined that the next schedules of the roads should go into effect Nov. 28, when the time system is to be generally adopted by the railroads throughout the country. A committee was appointed to arrange for the transmission of the time, consisting of W. F. Allen, chairman; H. S. Haines, of the Charleston and Savannah Road; John F. O'Brien, of the East Tennessee, Virginia and Georgia; F. Walcott Jackson, of the Pennsylvania Railroad's lines in New Jersey, and W. M. Clement, of the Baltimore and Ohio.

THE contest at Cincinnati over the election of three directors of the Ohio and Mississippi Railroad has terminated by a compromise, the directors elected being Robert Garrett, Edwards Whittaker and James H. Smith. This is the ticket which the Baltimore and Ohio interest in the beginning claimed had been agreed on by the London committee of shareholders.

THE last spike of the Kansas City, Springfield and Memphis Railroad, connecting Kansas City and Memphis, was driven on the 14th.

THE Commissioner of Railroads has made his report for the fiscal year ended June 30th, 1883, to the Secretary of the Interior. He reports that the properties of the several railroads within the jurisdiction of the Bureau are well maintained, and that while traffic is steadily increasing in volume the rates charged are gradually decreasing.

A SPECIAL cable dispatch from London to the Toronto *Globe* says: "The Grand Trunk railway report, issued on the 16th inst., shows a net revenue balance for the half year of £201,000. The payment of the full guarantee dividend on Great Western shares leaves a debit balance of £43,000 for adjustment at the end of the year. As compared with last year, the gross receipts of the past six months show an increase of nearly 10 per cent. The percentage of working expenses to receipts is about 2½ per cent. lower, while the net receipts show an increase of 19 per cent.

THE stockholders of the Nashville and Decatur railroad held their annual meeting on the 17th inst. Pres. Sloss submitted a report showing that the road was in a flourishing condition, and that the property of the company was continually increasing in value under the management of the lessees, the Louisville and Nashville Railroad Company. The old Board of Directors was reëlected. They held a meeting and reëlected J. W. Sloss, President, and George W. Seay, Secretary.

THE Pennsylvania Railroad Company has been petitioned to extend its tracks from Hentonville to Haddington.

ALL the stone quarries in Eastern Pennsylvania and New Jersey are being worked extensively for stone to be used on the Schuylkill Valley Railroad.

THE first through sleeping car to St. Louis via the Atlantic and Pacific and the St. Louis and San Francisco roads, will leave San Francisco on Saturday morning, Oct. 20.

OFFICERS of the Philadelphia and Reading Coal and Iron Company stated yesterday, in answer to questions about the reported demoralization in the coal trade, that their company had experienced no trouble.

THE Wabash Railroad Company has opened a freight line to the seaboard to be known as the "Wabash Eastern Short Line." It runs over the Baltimore and Ohio railroad to the junction with its main road and then over the main line and its connections to Detroit and the East.

THE bark Payson Tucker, Captain Tucker, sailed on 17th inst. from Philadelphia for Gibari and Matanzas, Cuba, with a cargo of platform cars and an iron railway bridge. The parts of the machinery are boxed, and will be put together on the bark's arrival at her destination by Philadelphia mechanics.

THE railroad machine shops, to be established at Birmingham, Miss., will in no way affect the shops at Meridian. The former are for the Alabama Great Southern, while the latter are for the New Orleans and Northeastern.

THE claim of the United States against the Central Pacific Railway Company, which has been pending for some time in the courts of California, for a large amount of internal revenue taxes, has been compromised. The terms of the compromise are that the railway company shall pay to the Government $69,000 and costs of the pending suit, and relinquish its claim against the Government for $26,818 on account of interest alleged to have been unlawfully paid on January 1, 1872.

AT the annual meeting of the stockholders of the Columbus, Springfield and Cincinnati Railroad Company, held at Columbus, Ohio, on the 18th inst., the following directors were elected: J. S. Farlow, N. W. Pierce, and J. D. Farnsworth, of Boston; J. A. Jeffrey, of Columbus; J. H. Thomas, of Springfield; J. L. Moore and J. D. Chamberlain, of Sandusky. The directors organized, electing J. S. Farlow president, J. D. Farnsworth, vice president, J. L. Moore secretary and treasurer, and O. P. Sampson assistant treasurer.

THE first through freight train on the Kansas City, Springfield and Memphis Road left Kansas City on the 17th inst. It consisted of 35 cars of meat, 5 of lard, 10 of grain, 2 of whisky, and 1 of fertilizers, 53 in all, and all from local consignors. The train was in two sections, and gaily decorated.

BUFFALO, N. Y., Oct. 18.—The Lehigh Valley Railroad Company is beginning to push things in Buffalo. It has just let to J. E. McIntire a contract for building 4,000 feet of double track trestle on its Scott street line, the work to be done and ready for the iron this fall. The company some time ago bought the Tifft farm, which lies near the harbor, in order to cut it into canals to increase the wharf facilities. It has now let to Mr. McIntire a contract for building eight miles of wharves on these canals. The work will require driving 65,000 piles.

THE people of Goliad, Tex., are trying to get a tap road to connect at Cuero. Huntington has agreed to construct the road for a bonus of $2,000 per mile. Nearly all of the required amount has already been pledged, and work will doubtless commence in a short time.

AT the annual meeting of the Pullman Palace Car Company; held at Chicago recently, George M. Pullman, Charles G. Hammond, John Creerar, Marshall Field, J. W. Doane, and Norman Williams, of Chicago, and Henry C. Hulbert, of New York, retiring directors, were re-elected. The statement for the year ending July 31, 1883, shows revenues of $4,093,245, of which $2,946,277 were earnings, $605,595 earnings of other associations operated by the company, $23,028 for patent royalties, $505,227 from manufacturing royalties, etc. The disbursements were $3,039,032, of which $976,380 were for operating expenses, $217,633 maintenance of upholstery and bedding, $175,702 proportion of operating expenses in other associations, $264,000 rental of leased lines, $171,074 interest on bonds, and $1,235,142 on dividends. The surplus for the year is $1,053,313. The assets are placed at $23,095,368, of which $9,858,049 is for cars and equipments, including assets, and $6,050,204 for the plant at the town of Pullman. The liabilities are $23,095,368. President Pullman, in his address, stated that during the year new contracts were made covering over 10,000 miles of railway, and renewals of old contracts covering over 7,000 miles. These contracts, he stated, required 121 additional cars, and means would have to be provided for the payment thereof. In accordance with this recommendation, the directors were authorized to issue the necessary 20 per cent. of new stock. Subsequently the board ef directors met and decided to issue 10 per cent. of new stock, amounting to $1,320,000, to provide for the new cars, payable Dec. 1. A quarterly dividend of 2 per cent. was declared, and also an extra dividend of 1½ per cent. out of the manufacturing interest, both payable Nov. 15.

THE directors of the Northern Pacific Railroad have authorized—subject to the approval of the holders of three-fourths of the preferred stock—the execution of a second mortgage for $20,000,000 on all the property of the company. The new mortgage is to be similar in terms and conditions to the general mortgage, subject only to the liens of the said mortgage. The preamble accompanying the resolution authorizing the second mortgage states that "there is now required to provide for the present unfunded debt of this company beyond the cash means available the sum of $9,459,920 83, and the additional sum of $5,500,000 will be required to complete the construction of the main line now under contract, including the bridges and tunnels, and provide and pay for all equipment required and contracted for. The finance committee was directed to open negotiations for the sale of $18,000,000 of the second mortgage bonds. The managers of the company say that they will not issue the other $2,000,000 of bonds at all. The preferred stockholders are called to meet in this city on Tuesday, Nov. 20, for the purpose of voting on the question. The following named officers have been re-elected: President, Henry Villard; vice president, Thomas F. Oakes; secretary, Samuel Wilkinson; treasurer, R. L. Belknap; general counsel, George Gray.

THE New Orleans *Times-Democrat*, says all through freight trains on the Southern Pacific road are now being equipped with the air-brake, and will have a schedule very nearly as fast as the regular passenger trains. By running in connection with steamships at this port, California freight can be delivered in New York and Liverpool five or six days sooner than by the regular all-rail route. The steamships have no freight blockades to contend with, and are never laid out on a side track. When they leave they keep moving at a rapid rate until they reach their destination.

THE "Racket" reporter of the New Orleans *Times-Democrat* is informed that large quantities of steel rails have been shipped recently to Texas, to be used in the construction of the Huntington branch road from Gonzales to Cuero. The line has already been located, and a great deal of the grade is now ready to receive the rail. It is the intention of the officials to have the road completed as soon as possible, in order to afford Southwest Texas an outlet to the Gulf. The Southern Pacific system, it is stated, will continue to construct branch roads into good territories, and thus establish important feeders for the main line, and also develop the country lying some distance off from the line.

THE work of grading the Pittsburgh and Neville Island Railroad has been commenced. The road is to be run the length of Neville Island, which is seven miles long, and cross to the mainland on the south bank at the eastern end of the island, connecting with the P. & L. E. R. R., and entering the city over that company's tracks. The road will be finished by next summer.

THE Railway Conductors' Convention at Kansas City, Oct. 19, elected grand officers as follows: Chief Conductor—C. L. Wheaton, of Elmira, N. Y.; Assistant Chief Conductor—Samuel H. Detries, of Toronto; Secretary and Treasurer—W. P. Daniels, of Cedar Rapids, Iowa; Senior Conductor—James Laughlin, of Kansas City; Junior Conductor—E. H. Belknap, of Galesburg, Ill.; Sentinels—L. P. Martin, of St. Louis, and J. D. Hamilton, of Canada; member of Executive Committee for three years—John N. Robinson, of Milwaukee; of Insurance Committee—C. A. Millard, of Elmira, N. Y. It was resolved to "use all honorable means to discountenance the use of intoxicating liquors among the members of the order while in the discharge of our train business and while transacting any duties relative to the order."

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A RAILWAY MISSION CAR.

FROM several of our exchanges we have noticed that there is a project on foot to build and equip a mission car for use on railways. The projector of this enterprise is a Mr. EDWIN A. HARRIS, of Fitchburg, who, for twelve years has been a railroad conductor, and connected prominently with the Railroad Men's Christian Associations in different sections of the State of Massachusetts. We are informed that for about nine months during the last two years he has traveled among railroad men in the South and West, holding religious meetings, and this project of a mission car has grown out of his experience and observation of what is needed to successfully prosecute religious work among the men in whom he is interested. We do not think that at first sight the project will strike thinking men favorably. There is something about special cars that gives them an air of snobbishness. An editor of a Western railway paper has one, certain noted actresses have theirs, men of wealth and sporting men have theirs. There is also a feeling among thinking men, that religion is an article that cannot afford to go through the country like a circus, attracting people to it by its noise and glitter. Religion to them means, not by power, nor by might, but by the spirit. It is not the thunder, but the lightning—not the earthquake, but the still small voice. Again are thinking men troubled when they see men leaving their business to start out as preachers, missionaries or revivalists. Many a man has been led to believe that he was religious when he was only bilious. A few cathartic pills restoring his physical nature to its normal condition, knocks religion out of him at the same time. Many men while in this bilious condition which they are pleased to call a religious frame of mind, have felt themselves called to leave their legitimate business to go and tell their benighted fellow men to look at them, and see the great work the Lord hath wrought. Thinking men look as invited, and inwardly wish that the man had gone to a bigger God, who would have done the work more thoroughly; or else that they had gone to AYER'S pill factory, in Lowell, instead. If the man is not suffering from biliousness, but is afflicted with old school theology instead, as the thinking man sits listening to his efforts, he has the feeling that a good wood sawyer has been ruined to make a mighty poor preacher.

Now the above remarks are written not in disparagement of Mr. HARRIS or his project, as we personally know nothing of him, but that he may not be discouraged if he does not find people as enthusiastic as himself in carrying out his project.

There are good and sufficient reasons why every man who sets himself up as a teacher of religion, should be severely scrutinized as to his character and fitness for

such. There are also many reasons why every proposed method should be carefully examined before adoption. There is none too much money hanging around loose for religious and charitable purposes, and that money which is available should be applied where it will do the most good. For ourselves, we are not in favor of multiplying the agencies for religious and charitable work, until the agencies already in force are better provided and cared for. Before mission cars are introduced, we would like to see mission churches better cared for. Before a missionary rides in a mission car from station to station, we would like to see a large number of missionaries now at work better fed and clothed. Still, with these feelings, we cheerfully offer Mr. HARRIS the free use of the columns of the JOURNAL to set forth his ideas and wishes to any extent he may wish, and if he is the right man and his project is feasible, we will use what little influence we have to help him along.

CREDITS.

THE question of credits is now forcing itself upon public attention in a way that will not be silenced. It is certainly time, for the anxiety to loan money and to sell goods has broken down many of the old-time barriers, until now, in business there is but very little distinction made between an honest man and a rogue. There is an opinion prevailing in the minds of men that if they wish to see a conservative man, they must take a look at a money-lender. There is no doubt but that this opinion is based in part upon fact, but by far the greater part is based upon what should be. Money-lenders are very careful when a new name on a note is brought to their attention. Take, for instance, a firm of great wealth and undoubted credit, not in the habit of issuing notes. When they wish a little accommodation and issue notes, they are very carefully looked up, and their affairs are sifted to the bottom before the accommodation is granted. The reason for this great carefulness on the part of the money-lender is, that he has never handled this paper before, and does not know how to handle it. But take the case of a firm always selling paper. When this firm first went into the market, their standing and responsibility were inquired into, their friends were interviewed satisfactorily, and the result was that the money-lender considered their paper a safe risk for the investment of his money. This firm always having paper on the market and always meeting same at maturity, become well known to the money-lending fraternity, and have no difficulty in getting what accommodation they need even when more responsible borrowers are refused. The reason for this is that the money-lenders are familiar with the sight of their paper. This is where the carelessness of money-lenders appears, and indicates a lack of the quality of conservatism. In this respect they resemble the locomotive engineer. When the engineer takes his first trip as such, with all the responsibility of life and property weighing heavily upon him, he is as careful as it is possible for human agency to be, and his train reaches the desired haven in safety without an accident. When he has had this responsibility long enough to get used to it, so that it does not weigh upon him, then he grows careless and indifferent, and a smash-up is the result. This is what we are now witnessing in the money world as between the money-lenders and concerns like the one last described. To-day the banks of the New England and Middle States must have in their vaults between 20 and 30 million dollars of notes, the makers of which have become bankrupt within the past 90 days. Now that there is a great change between the former days and now, in this matter of money lending, all old time merchants know full well. In those days a merchant required to be in good standing before he could get his bills receivable discounted at the bank where he kept his deposits. He had to be in unexceptionably good credit before he could sell notes of his own make, even when the banks knew that the money given on them was to be paid for merchandise, which was and still is a perfectly legitimate transaction. Now single name paper, if it is only known, passes almost without inquiry, and in too many cases such notes are not for merchandise, but to furnish the maker with means for speculative purposes.

This condition of affairs has arisen from two causes; first, the money-lenders finding it easier to handle one note of $5,000 than 100 notes of $50 each, and thus save themselves the trouble of making 50 entries and 50 collections, when one pays them just as well.

The second reason is the great abundance of money now as compared to former days. Money is worthless unless it is earning something, and when the money-lenders have more money than they can handle they grow less careful about loaning it, and therefore do not ask the questions they should. They run the risk of sacrificing the principal for the sake of the interest it earns.

There comes then a crash in the note market, the same as was experienced following a notable failure of Sept. 22, 1882, and money-lenders at a single bound, jump from the extreme of credulity to the extreme of skepticism, the same as the pendulum of a clock passes from its extreme limit on one side to the extreme limit on the other. Here is where the great injustice is done to the business world, there being for a time no distinction made between the deserving borrowers and the undeserving. The consequence is that suffering is brought upon a large class of trustworthy men, and that for no fault of their own. When the train is wrecked it is the fault of the engineer,

generally speaking, and so when there is a panic in the money market, it is generally the fault of the money-lender. He has been careless, and his carelessness has caused a wreck, and the wreck has weakened faith, and every would-be borrower, for the time being becomes an object of suspicion.

What we have written above regarding money-lenders and the borrowers of money, is also largely true of business men and their customers. Business is not conducted now on the same solid basis as in former years. We can remember an anecdote about a then leading merchant, and a young man buying his first bill of goods of him. The young man asked for a little credit, and it was immediately granted. The young man was astonished, as he expected to answer a number of questions and give good references. The old merchant told him this was not necessary, as he saw him in church the Sunday before with such a man, and he would trust anyone that that man would associate with. Then there was a distinction made, a marked line drawn between an honest man and a rascal. To-day there is not.

The question can very pertinently be asked why the merchants of to-day are less careful and particular than the merchants of former days, for there is no hiding the fact they will sell to rascals almost as readily as to honest men. Two reasons can be found for this state of affairs, one the great competition, the other, over-production. In reality there is but one reason, as the excessive competition is the outgrowth of over-production. Now this selling to a rascal the same as to an honest man is a great injustice to the honest man. The honest man will pay 100 cents on the dollar, while the rogue calculates at sometime to fail, and pay only 50 cents on a dollar. He can for this reason become a very dangerous competitor to the honest man, for he can sell his goods at less than cost, and when he fails pay 50 cents, and make his profit out of the merchant who has trusted him. The honest man, in order to pay in full, must get something above cost, and as the public prefer to buy where they can buy the cheapest, will pass his door and deal with the rogue. Thus the action of the merchant in selling to the rogue works great injury, not alone to himself, but to the honest man, the public, and to the rogue himself, for he is shrewd enough to see that as long as he can buy on credit and settle at 50 cents, he can undersell his honest neighbor and make the most money, and he has therefore no motive for reformation. In some States a man can fail and prefer his creditors. This is largely taken advantage of, and a man's wife or brother takes the bulk of the assets as a preferred creditor, and the man failing resumes business in his wife's or brother's name. This evil can be better understood when we state that within a week one concern has failed with preferences to unknown creditors for nearly $250,000. A loud call is now going up from Boston for a National Bankruptcy law, and if the coming Congress will enact such a one, either the Lowell Bill or some other equally as good, it will help business greatly, in the doing away of unnecessary failures. But after all, the great remedy is in the hands of the people themselves.

Merchants must make a distinction between honest men and rogues, not acting on the principle that because a man has just failed, he is a good risk for the next twelve months, and thus put in his hands the power to fail again The public have something to do in this matter also. They must be willing to pay for value received, which they can readily do by dealing only at one-price stores. A. T. Stewart built up his mammoth business on the one-price system, and everybody knew that a certain sum of money, whether in the hands of a little child or the shrewdest man, would buy the same quantity and quality of goods. To-day the great crying shame of the business world is that credit means so little. It does not add to the dignity of the man having it, for he may be a rogue; it does not add to the character of the merchant granting it, for he will give it to the rogue for the sake of getting rid of his goods. It does not help the public, for when these periodical failures come the innocent suffer with the guilty.

Our petition to the money-lenders and merchants is, that they return to the good old days of long ago, when giving credit was an act of grace, and the recipient of it was such because he was an honest man.

OUR esteemed contemporary, *The Artisan*, published at Nashville, Kentucky, finds fault with our spelling the word "Phenix," we suppose preferring the form "Phœnix" to that we have chosen. Nobody will be hardy enough to question that P-h-e-n-i-x does spell Phenix, and our preference for this spelling is that authorized by Webster. In short, convenience and the leading American authority are the reasons why the company issuing the AMERICAN RAILROAD JOURNAL is known to fame as the Phenix (not the Phœnix) Publishing Company. Next!

THE manner in which an advertisement is set is a consideration of great importance. Business announcements should be made pleasing to the eye of the reader, and the advertiser consults his interest very properly when he insists that this shall be done. The ideal of good advertising, so far as its matter goes, is reached when the expression is effective, and the style of setting both prominent and artistic. Our arrangements for the accommodation of people who have announcements to make, include an abundance and great variety of type, and the employment of hands whose superior merit as compositors is best

expressed in those of our pages appropriated to advertisements. The experience of all who advertise, and, of course, of those who patronize the AMERICAN RAILROAD JOURNAL, is that a steady continuance of the same announcement pays exceedingly well. It is a species of importunity which is sure of its object.

A BUREAU of information has been opened at the Grand Central Depot, this city, where the inexperienced and stupid traveler, as well as the intelligent and wide-awake itinerant in a hurry for information, can ply a courteous representative of the company with as many questions as their respective needs or idleness suggest.

Steel Rails.

A MANUFACTURING engineer writes to *La Metallurgie*, Paris, claiming that the success of rolling steel rails depends on the temperature at which the steel is rolled. He states from his own experience that bars which were finished at a bright red heat (and which were recognizable after cooling by their blue tint) were more fragile under tests by striking or flexion than those finished at a lower temperature.

DURING the month of August, 724 persons were paid benefits as members of the Baltimore and Ohio Employés' Relief Association. The care with which cash is paid out by the association appears in the publication, every month, of a sheet containing the exact details of said distribution. This sheet is intended to be posted in prominent positions, and is headed by the following announcement, printed in very conspicuous type: "This statement is published with a view of inviting the criticism of members upon payments made, and the secretary particularly requests to be informed of every case where benefits were not justly earned through total disability for the periods stated."

THE Boston and Albany road has instituted a movement in the proper use of English words. It no longer has "Gentlemen's rooms" and "Ladies' rooms" at its stations. They are now inscribed "Men's room" and "Women's room." This is certainly plain to understand. Nevertheless it probably does not hurt to call a man a gentleman or a woman a lady.

THE death was recently announced in England of Mr. George Remington, the engineer who in 1840, in conjunction with his father, projected the first metropolitan railway, called the Grand Junction Railway, which was to run from Snow Hill, Holborn, by way of King's Cross to the West of London. His project for a channel tunnel, published in 1864, was the commencement of the present movement in this direction.

A MIRROR has been attached to the cabs of engines on the Buffalo, New York and Philadelphia Railroad in such a way that the engineer has full view of his train without leaving his seat.

Financial.

WE do not note any improvement in the demoralized condition of Wall street interests, but on the contrary for several days back have witnessed what might be termed a semi-panic. This state of affairs exists too when there is plenty of money, and but one solution can be offered, and that is lack of confidence. There are plenty of sellers but no buyers except bears covering their shorts, and largely interested parties trying to sustain the values of their properties. The old-time business man cannot help but notice how limited in its workings is this disturbance on Wall street. The money market continues quiet, and business houses have no trouble in getting their usual accommodation from the banks. Hardly any change takes place in the bank rate, and no agitation whatever is noticeable in moneyed circles, no matter how many points a given stock drops off in a day. When we take into account how wide reaching such a condition of affairs in Wall street was years ago, and how little of it is felt outside of Wall street to-day, we have the surest guarantee that trading in stocks is almost, if not completely, confined to the brokers and their immediate friends. We are glad to record this because men in legitimate business are not safe when they step outside, no matter how promising the venture may appear. We have known many large and prosperous firms making money in following their legitimate callings, completely swamped and ruined when they stepped aside to engage in outside speculations, whether in stocks, real estate, or merchandise.

While we record the above state of affairs as regards Wall street, and the connection of the outside public with it, we are well aware that though the commercial world is in no sense mixed up with that state of affairs, yet there is no improvement to record in the commercial situation. This to the casual observer appears to be a rather singular phenomenon, but to the careful student of business life only proves how closely one branch of business is allied to every other branch. The struggle that is in progress at the Stock Exchange imparts a degree of discouragement to all the different branches of business, to the extent at least of preventing any improvement. This state of affairs is noticeable in those trades ministering to the pleasures of mankind; and somewhat noticeable in those trades ministering to their wants. To many others as well as to ourselves, this state of affairs is unaccountable, except we sum it up in the few words, "*lack of confidence.*"

From the "Financial and Commercial Chronicle," to which paper we largely refer when in doubt on financial questions, we copy the following regarding the income and condition of the Lake Shore and Michigan Southern Railroad.

"Within the past year or two the position of the Lake Shore has undergone considerable change. The through business for which it competes has to be divided among a greater number of lines than formerly, but, more particularly, the company has taken one of the new lines—the New York Chicago & St. Louis, or 'Nickel Plate'—within its own fold, and therefore become to a degree responsible for its success. It cost the Lake Shore $6,527,000 in 7 per cent. second mortgage bonds to get

control of that road, and this, of course, involves an increase in the fixed charges to amount of $456,890 per annum. The company's fiscal year is the same as the calendar year, and the report for the year 1882 was published in the CHRONICLE last May As the Nickel Plate purchase, however, was not effected till November of that year, the increase of fixed charges did not enter into the year's account. In the figures below for the year ended the 1st of July, 1883, the increase presumably counts for half its full amount, That the reader may see at a glance how the results for that year compare with those given in the report for the calendar year 1882, we have prepared the following for the two periods.

	1883.	1882.
Gross earnings	$19,492,089 00	$18,225,639 00
Operating expenses and taxes	11,436,736 00	11,057,807 00
Net earnings	$8,055,353 00	$7,167,832 00
Interest, etc., on assets	88,492 00	98,391 00
Total net income	$8,143,845 00	$7,266,223 00
Payments—		
Interest on debt	$2,969,125 00	$2,714,955 00
Rentals	417,461 00	357,086 00
Dividend on guaranteed stock	53,350 00	53,350 00
Sinking fund	250,000 00	250,000 00
Total	$3,689,936 00	$3,375,391 00
Balance	$4,453,909 00	$3,890,832 00
Eight per cent. dividend	3,957,320 00	3,957,320 00
Surplus	$496,589 00	def. $66,488 00

"The difference between the two periods is quite marked. While in the calendar year there was a small deficit below all charges and 8 per cent. dividends, in the year ended July 1 there was a surplus of pretty nearly half a million dollars, and this, too, despite the fact that there was an increase of $60,000 in the charge for rentals and $255,000 in the charge for interest in the latter period. It should be said that in the company's report no deficit for 1882 is shown, but rather a surplus of $183,511; but this is due to the fact that we have concluded in our statement the $250,000 contribution annually required for the sinking fund on the 1st mortgage bonds, counting it as a yearly charge, while the company omits it from income account altogether. As we have however, introduced the items in both the periods given, the comparison is not affected. Should we leave out the allowance for sinking funds, the surplus for the year to July 1 would be $746,589, as contrasted with the surplus of $183,511 for the year to January 1.

"The calendar year and the fiscal year embrace in each case six months of the same period of time, namely, July to December, 1882, and it follows therefore that the difference in results between the two years, marks the difference between the first half of 1883 and the first half of 1882. Hence we see that the first six months of 1883 show an increase over the corresponding six months of 1882 of $1,266,450 in gross earnings and $887,521 in net, which is somewhat less favorable than was the company's approximate exhibit, made at the end of the half year. Interest on investments realized $9,899 less, so that the actual gain in net income was $877,622. Against this, interest and rentals were augmented $314,545, leaving the real improvement over the six months of 1882 $563,077. That is, the amount left for dividends was that much greater in the first half year of 1883. But that period in 1882 was exceptionally bad, and notwithstanding the improvement made in the first six months of 1883, the company fell short of earning the half-year's proportion (4 per cent.) of the dividends on the stock. In other words, not the whole, but only about two-thirds of the deficit of $900,000 recorded in 1882 (after all charges and full dividends) has been wiped out. Too much, however, should not be made of this deficit for one-half a year. The period from July to Deeember is almost always much more profitable than the period from January to July—in fact the six months of 1881, when the trunk-line war was being waged, form the only exception to that rule, over a number of years. In 1882, for illustration, the whole of the $900,000 deficiency of the first half of the year was made good in the second half. In order to get a correct idea of the company's earning capacity and dividend power, a full year's results must be taken, and the table above enables that to be done either for the calendar year, 1882, or for the year to July 1, 1883.

"The figures for this year to July 1, must be accepted as in some measure limiting the outcome. We find a surplus of $496,589, but the calendar year will call for a larger charge for interest and rentals than is allowed in reaching that surplus. If we assume that the augmentation will be the same in the second half of the year as the table shows it to have been in the first half, then this surplus will be diminished in the sum of $314,545, reducing it to $182,044. Hence, if the company does as well in the six months from July to December, 1883, as it did in the same months of 1882 (which latter were the best six months in its history, and when neither the Nickel Plate nor the Chicago and Atlantic was in operation), the road will make enough to meet its increased charges, the full amount of 8 per cent. dividends, and yet carry forward a surplus of $182,000. If we take out the $250,000 for sinking funds, the surplus would be $432,000, and this amount the company could lose in net earnings (compared with July to December, 1882) in the last six months, and still meet interest and dividends. It should be said that some uncertainty exists as to the call that the Nickel Plate road may make upon the Lake Shore. The 6½ millions of its own bonds which the Lake Shore issued for that purchase we have already taken into account, but the Nickel Plate has a large individual indebtedness—15 millions first mortgage bonds, 10 millions second mortgage bonds, and 4 million equipment bonds, calling for $1,780,000 interest yearly, and it is not clear that the road can take care of that itself at the outset, in which case the Lake Shore might have to make good the deficiency.

"The statement of the Lake Shore's capital account on the 1st of July is compared with the same items as reported in the annual report on the 1st of January."

LIABILITIES.

	July 1, 1883.	*Jan.* 1, 1883.
Stock	$50,000,000 00	$50,000,000 00
Debt	44,716,000 00	44,716,000 00
Current liabilities	2,834,632 00	2,133,677 00
Dividend due 30 days after date	1,016,005 00	1,016,005 00
Income balance	4,521,259 00	4,896,002 00
Total	$103,087,896 00	$102,761,684 00

ASSETS.

Construction and equipment	$83,669,000 00	$83,669,000 00
Detroit, Monroe and Toledo Railroad	1,381,600 00	1,381,600 00
Kalamazoo and White Pigeon	610,000 00	610,000 00
Northern Central Michigan	1,357,000 00	1,357,000 00
Interest in Jamestown and Franklin R.R.	2,129,915 00	2,123,909 00
Interest in Chicago and Canada Southern	715,000 00	660,000 00
Stocks held	8,240,218 00	8,239,078 00
Bonds held	1,247,908 00	1,156,918 00
Supplies, etc	1,003,199 00	1,355,153 00
Cash, etc	1,662,234 00	1,138,587 00
Other items	1,071,822 00	1,070,439 00
Total	$103,087,896 00	$102,761,684 00

Incineration.

BY REV. ASHER ANDERSON.

THIS is the subject of an article to which thirteen pages of the *Princeton Review* for September have been devoted. If never before, certainly now, the subject has had a respectable prominence given to it, and the public may be assured that when once under way prejudice will have to yield, as it has yielded in many other instances, and doubtless the day is not far distant when cremation will be as popular a mode of burial as any which has hitherto been in vogue. It may be said that methods of burial are matters of human opinion merely. The Egyptian is pleased to wind innumerable yards of sheeting about a corpse for its preservation, because sometime the spirit will return and occupy the body again. The Indian erects three poles, from the upper ends of which is stretched a canvas on which the remains are placed. There is nothing canonical about putting the body into the ground. In Bible times the dead were placed both within a grave and rock-hewn tomb, and the assertion is a safe one to make that we are not compelled as Christians to adopt any particular method, except that which will secure health to those who still live. And this consideration is now emphasized by those studying modes of burial from a sanitary point.

The writer of the article is careful to set forth such a fact in its strongest light. The best authorities are quoted, as Sir Henry Thompson, who affirms "that no dead body is ever placed in the soil without polluting the earth, the air, and the water above and about it." And he goes on arranging a series of facts concerning burying in the ground and grave-yards, the reading of which makes one wish that not a body had ever been put beneath the soil of earth. He tells us of deadly exhalations with which the atmosphere of cemeteries is filled. How easy it is for those who linger at the burial of loved ones to carry with them germs of disease. That experiments have proven how earth-worms bring to the surface myriads of bacteria from bodies in the graves. What significant discoveries have been made against the cause of yellow fever epidemics, on which ground causes are found for the plague at Modena, in 1828, and in London, 1854, which latter was doubtless caused by overturning the soil in which had been buried the bodies of the plague stricken in 1665, and more still, that our wells, fountains and watercourses are all more or less contaminated because of their proximity to burial grounds.

The writer calls attention to the present methods of burial in large cemeteries where several are placed in one grave, coffin upon coffin, until the upper coffin is within a foot or two feet from the top of the ground. We remember passing through a cemetery, not 1,000 nor yet 10 miles from New York, in which are found graves where four, five, six and even seven bodies have been buried.

The writer does not refer to the indiscriminate burial of slain soldiers, whose bodies are laid in trenches not very deep and hastily covered up, though he may have had that in mind. A battle-field may in after years become a plantation or a farm, but the farmer never suspects that death in his home is occasioned by the zymotic conditions which lie at his very door.

We are not surprised that the reverend writer is a strong advocate for incineration. He asks, what is decomposition? Simply, oxidation. The body that is burned begins, yes even before it is burned, "to burn up." Under the circumstances of a burial this process of "burning up" is slow. The difference therefore between incineration and sepulture is a difference of time, since in both instances the bodies are consumed unto ashes. And we are persuaded that the writer is correct when he declares that any opposition to cremation is the outcome of prejudice, the same prejudice which never would allow a revision of the scriptures, or the changing of some ecclesiastical formula.

Mr. Bengless answers the manner and objections to incineration in an exceedingly favorable manner. Some will say, death by poisoning could not be determined, but all non-volatile mineral poisons would remain in the ashes. Some will say that deaths are too numerous to make it practicable; he replies, make the crematory large enough to do the necessary amount of work. Some will say, that it is heathenish; he answers saying it was heathenish before it became Christian. He also finds a recognition of the doctrine in the Old Testament. He argues in favor of incineration because: 1. It is a more healthful manner in which to dispose of the dead; there can be no decomposed matter to impregnate the soil and air and water with impurities. 2. It is decidedly a more cleanly method, since in this way the body is not given to the ground to become food for worms. 3. It is safer than burial, tombs like those of Stewart, Lincoln and Garfield will not have to be guarded. 4. It will remove from our minds any apprehension that the dead might have returned to life after burial. 5. It will allow us to have with us in this life and in all places where we reside, the ashes of the loved ones. 6. And it will prove to be more economical than the present expensive funerals.

We can imagine how quickly some will say, that cremation may not be consistent with the Bible doctrines of the resurrection, to which the answer is an easy and conclusive one to make. What will become of the martyrs, will they rise? We are glad that the subject has had given to it such important consideration, and we are satisfied now that the question is open, and its fuller discussion will bring us to much clearer light and a greater advance upon something which concerns the health of the nations.

We wish, before closing this reference to the article in the *Princeton Review*, to call attention to something upon which as yet we have seen nothing written and have heard nothing said. Science is the handmaid of religion; it is remarkable to observe how science is ever proving the truth of the Bible narrative. The book has lost nothing but gained immensely through the researches of the scientist. Now science is beginning to advocate incineration. Does it occur to the Bible reader that the world, by-and-by, will be destroyed by fire? After this there will be a new heaven and a new earth, and of that the Bible speaks "*there shall be no sickness there.*" No inhabitant of the world to come will ever say "I am sick."

INSTANCE OF CANADIAN ECONOMY.—An old servant of one of my friends, says a writer in *Harper's*, was bred to such careful habits that she wears out her calico robes without ever washing them, and yet she is considered to be neat and clean. Her parents had sixteen children, and they raised their entire family on one paper of pins and one catechism. Thorns were used, and other pins left at the house for the long winters.

Standard Railway Time.

W. F. ALLEN has contributed his views on this important question to the *Century Magazine*. Speaking of the effort now being made in railway circles to arrive at a "good enough" time, he summarizes a system proposed, and which will be considered at conventions of railway managers to be held in Chicago and in New York City during the present month.

The system proposes: That the same standard should be used by all lines within sections as largely extended as may be possible, without entailing such a difference between local and railroad time as to cause inconvenience to the public. It is believed, however, that as exact time is seldom required, except for purposes connected with transportation, standard time could be readily substituted for local time in all cases where the difference would not be much over thirty minutes. That where a second standard becomes necessary, it should differ from the first by the simplest and most readily calculated variation—an even hour. That the changes from one standard to another should be made at well-known points of departure, and so far as may be possible at points where changes now occur, and where no practical difficulty would cause danger or inconvenience to railway operations.

The section of country which includes within its limits over eighty per cent. of all the railways lies within thirty degrees of longitude westward from the eastern boundary of the State of Maine. In railway circles, all roads east of Buffalo, Pittsburgh, Wheeling, Bristol (Tennessee), etc., are distinctively known as Eastern roads, and the lines west of those points as Western roads. A meridian line drawn centrally between their eastern and western extremities coincides almost exactly with the seventy-fifth meridian west from Greenwich. A similar grouping of the Western roads between Buffalo, Pittsburgh, etc., on the east, and the western boundary of Kansas on the west, develops the fact that the ninetieth meridian west from Greenwich is very approximately the central meridian for the system of roads embraced within that section. The seventy-fifth and ninetieth meridians being fifteen degrees apart, their time differs by an even hour. It is proposed that all railroads east of Buffalo, Pittsburgh, etc., shall use the seventy-fifth meridian time, which is approximately four minutes slower than the meridian time of New York; and that the Western roads shall use the ninetieth meridian time, which is nine minutes slower than Chicago time. The meridian equidistant from these central meridians crosses the railway lines in Ohio and other States at points where the peculiarities of railway operations prevent the change being made from one standard to another, and the difficulty has been met by extending the Western standard to the eastern termini of such roads at Buffalo, Salamanca, Pittsburgh, etc. Similar practical questions decide the standards for all roads south of the points named to Charleston, South Carolina. In Canada, all roads between Quebec and Detroit would use the seventy-fifth meridian time. The western limit of the ninetieth meridian, or "central time" system, is fixed at points on the great transcontinental lines, where a complete change is now made in the personnel of the hands in charge of trains, or, more technically speaking, at the ends of divisions. The standard for the next western or "Mountain" system is the time of the one hundred and fifth meridian, which coincides with Denver (Colorado) time, and, for the Pacific coast, that of the one hundred and twentieth meridian. The change from the Mountain to the Pacific system is proposed to be made at Yuma, Ogden, and Missoula, all convenient locations. For the extreme eastern section, east of Quebec and Vanceboro, the sixtieth meridian time may be employed.

Multiples of Greenwich time have been adopted for the system proposed, because they have been found to be the meridians best adapted for the purpose desired to be accomplished.

By the adoption of this system over eighty per cent. of the railroads will use but two standards where they now use forty. and these standards will differ from each other by an even hour. The standard for each section will differ from every other section by one, two, three, or four hours; hence the minutes will be identical in all the sections. At points where the changes are made from one standard to the next, as Pittsburgh, Wheeling, etc., similar changes are now made, the distinction being that instead of the readily calculated difference of one hour these changes now consist of differences of odd minutes varying from thirteen to thirty-six, numbers inconvenient to calculate, and which constantly cause annoying mistakes.

Facts About Color-Blindness.

IT appears from a lecture delivered recently in Boston, by our esteemed correspondent and an authority on his subject, Dr. B. Joy Jeffries, that the hundreds of thousands of examinations of people in all parts of the world made by experts the past few years, have shown that about four in a hundred males are more or less color-blind, whilst the defect is a rare one among females, only about one-fourth of one per cent. having been found lacking in the chromatic sense. This exemption is not attributable to their greater familiarity with colors, but is by the best authorities considered as simply a sexual difference.

The examinations and the study of the color sense induced thereby, have brought into notice the fact that the other ninety-six out of a hundred males, who have a normal color sense, are yet quite ignorant as to colors and color names. Dr. Jeffries's report to the Boston school board, of his examination of some twenty-eight thousand scholars, entirely substantiates the experience of his fellow experts in other parts of the world. In consequence, the attention of educational authorities has been directed to the question of color teaching for some three years past. Its necessity has been gradually recognized, and finally the Boston school board has decided to introduce some systematic teaching in the primary department, in place of what has proved nearly valueless.

The lecturer illustrated the uselessness of asking the names of colors to test the chromatic sense, and proved the value of the Holmgren method by the fact that the person examined need not speak, need know nothing of colors or even have seen any. The misuse in this respect of the method, and its imitation by railway officials in testing employés, caused a smile in its narration. As our readers know already, the Holmgren method compares, not matches worsteds. Dr. Jeffries claims that it has also pointed out the true means of teaching color, and the education of the normal color sense. The speaker

showed how the ear had been taught, the form perception educated, and the hand instructed, by thorough methods in our schools, and how the color sense could be educated by very simple means. He had, like others, thought out various plans, but finally turned to that of Dr. Magnus, based on Holmgren's experience.

As future railway employés will, of course, be males, and as most of these in all probability will have been educated in public schools, the action of the Boston school board in the premises, which, we learn, is the first official recognition of the subject anywhere, cannot be too highly commended by a railroad paper. We think that it certainly deserves imitation.

RAILROAD MEDICAL SERVICE.

BY S. S. HERRICK, M.D.,
SECRETARY BOARD OF HEALTH, STATE OF LOUSIANA.

ITALY CONTINUED.

The Pension Fund (La Cassa-Pensioni.)

AMONG the papers relating to the medical service of the railways of Northern Italy, which I have received, is the Constitution of the Association for Mutual Relief by Pensions, styled Pension Fund (*Cassa-Pensioni.*) This association, founded Jan. 1, 1862, by the Concessionary Society of the railways of Lombardy and Central Italy, has been extended to the employés of the railways of Northern Italy. Its object is to provide pensions for themselves, their widows and orphans, and it operates independently of the *Consorzio di Mutuo Soccorso*, previously mentioned.

The Pension-fund is sustained: 1. By deductions from the wages of employés; 2. By a contribution from the railroad company; 3. By legacies and donations; 4. By interest on the investment of funds.

Contributing members have 3 per cent. deducted from their monthly wages, in addition to deductions for sickness, absence, suspension, the Relief-fund, the Clothing-fund, tax on movable property, etc. This is paid during the whole term of service, and is applicable only to wages proper, and to additional pay of a permanent character, such as premiums for extra work, the savings and back-pay recovered by the *personnel* of trains; and does not apply to special allowances for office-rent, traveling, lodging, etc. There is a further deduction of one-twelfth of every increase of pay, to take effect from the first month after the increase begins. In any month the three-per-cent. deduction is reckoned upon the pay of the preceding month.

The company contributes monthly to the pension-fund a sum equivalent to the 3 per cent. deduction upon the wages of employés and the arrears paid to old employés.

Employés assigned to permanent service with a fixed annual pay have full right and obligation to become members of the *Cassa-Pensioni*, provided they are not over 35 years of age. Those entering service above this age are admitted to participation in its benefits only upon application, and by vote of the directory after proposal by the Committee of Administration. The same rule applies to employés not Italian by birth and those not naturalized as citizens. Those employed by the day or only temporarily can not be admitted to membership. Every one, previous to admission, must present to the Committee of Administration his certificate of birth.

Any member may be put on the retired list by decision of the Council of Administration. Any member who has contributed at least six years, is entitled to a yearly pension equal to five-sixths of the amount which he has paid in annually, provided this pension do not exceed three-fourths of his last salary subject to deduction. If the employé, when put on the retired list, was attached to train service, the maximum of the pension will be calculated upon his last rate of pay, augmented by the annual mean of the allowances which he has earned by premiums for over-mileage, savings and deductions returned. Any employé who has reached the regular limits of age and of service, and been a contributor not less than six years, can be placed on the retired list, whenever for any reason he is unfit for duty.

After contributing for 25 years to the pension-fund, any employé is entitled to a pension on reaching the age of 55 years. Those engaged in the various duties of train-service have the same right after 20 years' contribution, provided they have attained the age of 50 years; but this advantage of earlier right to pension is lost on transfer to another branch of service.

Whenever through injuries received in service, duly certified, an employé becomes disabled and is so declared by a medical commission, he is entitled to the normal pension, as if he had been a contributor for 20 or 25 years, according to nature of service, whatever may be his age or duration of service; calculating the deductions for completion of his years of service upon the basis of his last wages. If by infirmity contracted in the line of duty, the employé has become disabled after contributing for six years to the pension-fund, he shall be entitled to the usual annual pension, according to payments made, subject to increase on favorable report by the committee to the Directory, but not to exceed three-fourths of his earnings.

The widow of an employé, dead after six years' membership, is entitled to an annual pension equal to five-ninths of the husband's earnings. If his death was caused by injuries received in service, the widow's pension will be the same as if he had contributed for 20 or 25 years, according to nature of service. If the husband died through infirmity contracted in the line of duty, the Directory, on recommendation of the committee, can increase the usual pension; but in no case can it exceed one-half the wages received by the husband at time of death. The widow of a pensioner is entitled to continuance of two-thirds of his pension. Unless the husband died in consequence of injury received in the line of duty, the right of the widow to its continuance is conditioned that the marriage took place at least three years prior to his death or retirement, and before he had reached the age of 50 years; but the first of these two restrictions may be lessened by the committee. The widow of a contributor not fully entitled to a pension may receive, as a relief once for all, an allowance fixed by the committee, not exceeding one year's wages or pension of her husband; and, in case there are minor children, each one is entitled to one-tenth

of this allowance, amounting collectively to not more than one-half, while the remainder goes to their mother.

Legitimate children of a deceased member are entitled, up to the age of 18 years, to the following allowance: *a.* The mother living, each child receives one-tenth of the pension which the father enjoyed at the time of death, or to which he was entitled, provided that the total amount assigned to mother and children collectively must not exceed 75 per cent. of the father's pension. *b.* After the death of both parents, each child receives one-tenth of the father's pension, provided that the total amount assigned to the children must not exceed 50 per cent. of the same. *c.* If the deceased employé had married twice and left children of both marriages, together with the last wife, all are entitled to pensions; then the difference between two-thirds of the husband's pension (amount accruing to the widow when childless) and three-fourths (maximum allowed to widow and children collectively) goes to the children of the first marriage, reversible to those of the second when the former have reached the age of 18 years. *d.* When only the minor children of the first marriage are entitled to the pension, each receives one-tenth of the father's pension, amounting collectively to not more than one-half of the same; while the other children, together with their mother, may receive once for all an allowance equal to one year's wages. In all these cases, the pensions accruing to minors will be paid in full to their legal representative. Orphans of less than 18 years of a member deceased without acquiring right to a pension, can receive collectively a relief once for all equivalent to what their mother would receive, were she alive. The pension of a male orphan ceases whenever he goes into service of the company; and that of a female on contracting marriage.

In case a regular pension amounts to less than 100 *lire* annually, the committee may settle it by a single payment, which can be in no case more than the employé's wages for one year. Any one who has been invalided and retired from service, may have his pension adjusted, upon demand, according to conditions previously mentioned. Pensions are paid quarterly on production of certificates of survivance by the claimant. In case of a widow, the certificate must furthermore prove permanence of widowhood. All pensions granted by these regulations are considered quittance of claim.

Pensions run as follows: 1. For the employé, from stoppage of wages to death. 2. For the widow of a contributor, from stoppage of her husband's wages or pension to her own death; but on her marrying again, it ceases immediately. 3. For minor children, from stoppage of father's or mother's pension to the age of 18 years, conditions elsewhere noted being excepted.

The employé forfeits claim to pension, by decision of the Directory: 1. On voluntary retirement from service. 2. On being required for military service. 3. Whenever, through infirmity or disease contracted independently of service, he has quit work, having contributed less than six years to the pension-fund. 4. Whenever the man's service has ceased within six years of contribution, by reason of abolishment of his occupation. 5. On conviction of felony, before or after adjudication of pension. 6. On conviction of misdemeanor which involves loss of employment. 7. Whenever, by decision of the Directory, he has been discharged for willful violation of rules, for acts or threats against superiors, for theft, for insubordination or grave neglect of duty. In case of forfeiture for 2, 3 or 4, the employé can claim the refunding of his contributions, without interest: in the others, the payments accrue to the pension-fund.

The widow forfeits claim to pension: 1. When, at death of husband, through her own fault she was living separate, without alimony, whether judicially or extra-judicially. If, however, she had enjoyed alimony, the committee will decide the limits of pension, in no case greater than her alimony, nor less than the allowance made to widows of those who have not acquired right to pensions. 2. By reason of scandalous conduct or conviction of crime. In these cases, as well as when the widow marries again, minor children are regarded as complete orphans, and are provided for as previously stated.

Orphans likewise forfeit pensions on conviction of crime.

Whenever the resources of the Pension-fund evidently exceed all needed requirements, the contributions may be temporarily reduced, both for employés and for the company. If, on the other hand, they are found inadequate, the Directory may either increase the contributions of the employés and of the company, or reduce the pensions. In the last case, pensions of 600 *lire* or less are not subject to reduction. On augmenting or reducing contributions, pensions are always adjusted as if the deduction were 3 per cent. of wages.

The *Cassa-Pensioni* is administered by a committee composed of one of the honorable Directors designated by the Council, of the General Manager, of the Superintendents of Operation and of Maintenance, of the Chief Attorney, of the Chief of the Department of Accounts, of a superior employé in the office of General Control, and of several superior employés in various branches of Operation and Maintenance, these last employés to be named by the Directory. This committee is presided over by the member who is a Director of the Company; in his absence by the General Manager; in his absence by one of the Superintendents. Six members constitute a quorum, and questions are decided by a majority of members present. Meetings take place at least quarterly.

The Committee decides finally: 1. Upon the collection and disbursement of the funds of the Association. 2. Upon the settlement of pensions and allowances in the regular way. 3. Upon all ordinary cases arising under these regulations. It acts in advisory capacity: 1. On applications for increase of pension, in cases provided for in the regulations. 2. On claims which may eventually be made upon it. 3. On all questions to which the present regulations are applicable. 4. On modifications to be made to these regulations. The minutes of sessions of the committee are communicated to the Directory. At the end of each year the committee renders a report of the condition of the pension-fund and of its administration of the same to the Directory, and furnishes copies to those interested.

The Association can not acquire nor possess immovable property not strictly necessary for its purposes, and must immediately sell whatever has fallen to it by expropriation, abandonment or donation.

The Committee, by authority of the Directory of the Company, may initiate and conclude treaties, either by a general fusion or any other arrangement judged conducive to the interests of the Association, with institutions of

similar nature created either by government or by other companies. In case of annexation of new lines or fusion with another railway company, employés in the latter may be admitted from date of annexation or retroactively, as may be determined by special action.

[*To be continued.*]

Lubricating Oils.

A subject of great importance, but very much neglected by manufacturers and railroad men, is the lubricating of machinery and rolling-stock. This is generally looked upon as of little importance, and would probably receive no attention at all were it not occasionally forced on their minds by heated bearings causing stoppages and repairs, saying nothing of accidents for which they can assign no direct cause. There are very few traveling people who have not experienced delay from overheated bearings, and witnessed the anxious efforts of the train hands to overcome the difficulty, and thus guard against disastrous consequences.

Many people entertain great fear of accidents, the cause of which it is almost impossible to anticipate, even with exertion of utmost care; but much greater would be their apprehension did they know that careless neglect of this important subject and false economy daily add an important factor to the possibility of accidents.

Now wherein consists such want of care and false economy? In the use of poor and apparantly cheaper lubricants. It is rarely the case that managers or purchasing agents of railroads possess any knowledge of the characteristics of lubricants, and fewer still have the least conception of the theory of lubricating. Even some of the most accomplished and experienced machinists and engineers are sadly ignorant on the subject, and fall an easy prey to designing oil concerns, whose sole object it is to sell their residuum to best advantage.

Lubricating is the interposition of substances which absorb the frictional heat generated by motion and, transferring it into space, prevent the parts in motion from abrading each other and becoming heated. In order to do this effectually, the interposing substance must be free from grit, (inert matter) that could promote abrasion of itself, and must possess the ability to fully absorb, but in the same ratio dispose of, all the heat produced by the motion. It should therefore retain a nearly uniform consistency through all seasons of the year, possess enough viscosity to maintain its adhesiveness, and be of such fire test as to secure eradiation proportionate with its heat absorbing quality.

Thus it will appear that it is not enough to mix still residuum with light oils, and produce a mixture of apparently satisfactory gravity. Residuum is seldom free from grit, and the oil wherewith it is diluted is of such fire test as to evaporate too fast; it is not able to eradiate all the heat absorbed by the heavier residuum. The oils generally used for this purpose contain all the lighter petroleum products, and frequently even the cheaper grades of benzine alone are used. The danger of using such oils can be easily understood; they are dangerous in store and factory, and while in use their rapid evaporation leaves the gritty and charred matter of the residuum to accumulate, and finally abrade and heat the bearings.

Only such oils should be used as have been freed from their lighter products and mixed with fatty matter, or such residuum as has been previously freed from all grit and scorched impurities. They cannot be obtained at so low a price as the cheaper mixtures, but aside from their greater efficiency will prove themselves cheaper in the long run. The plea often made that the hands pour the oil on anyway and waste too much, is absurd. When the oil is inefficient and when poured upon bearings runs through as fast as it is put on, reckless use becomes unavoidable, and the using of better and efficient lubricators alone can prevent it. The question of economy lies not in what an oil costs, but in what it is able to perform. Increased efficiency, reduced expenses of repairs, saving of time and labor (the oil lasting longer) and greater safety, make the higher priced oils the cheaper.

English Railway Arrangements.

We hear a great deal at home about the annoyance of the compartment system of railway carriages, but it has its advantages. Each compartment opens independently of the others, and so a train is loaded and unloaded very rapidly. There is nothing whatever of the annoying delay that we have in getting in and out at stations. It is all done at once and without confusion. As for tickets, you do not give them up until you arrive. There is, therefore, no bother of continually showing a check to the conductor. The names of stations are not called out, but they are very plainly marked in a dozen different spots at each place, and the guards can always be called to from the window for information. The guards are uniformed and look very well, but the porters and station men are more elegant yet. At Hereford, for instance, which is but a small, quiet town, our baggage was taken possession of at the station by an elegant and stately gentleman, wearing a stove-pipe hat and a suit of dark blue made up in the long coat fashion. It seemed like a favor to have him consent to accept a sixpence. But they all do consent. Some excellent American, Hawthorne I think, remarked that his only regret in thinking over his experience in England lay in the fact that he hadn't offered the high chancellor a shilling. At every railway station, suppose you wish to stop over, there is a "left luggage" room where for four cents (tuppence) they take care of your baggage. Every station, too, has a capital book-stall. It is not merely like ours, a news-stand, but it has good literature, and a plenty of it. Then, too, each important station has its restaurant. Every restaurant is a rum-shop. There is every facility for a good meal, but besides that, certainly on some roads, the opportunities for getting drunk surpass anything we know in America. Pocket bottles, thin but copious, are spread out on the counters for sale, containing rum, brandy, whiskey, gin, sherry or port, etc., and boys go from car to car offering these for sale. There is nothing done on the sly; and at the lunch-counter there is often a regular bar, always presided over by a neat and tidy girl, who sells the strongest liquors with the mildest expression of countenance. Apparently nobody is ashamed to drink. They all do it openly and make no secret of it. In London, indeed, so much of it is done that they sell champagne by the glass—a liquor which is supposed to spoil by opening. "Champagne, one six-

pence" is a common sign there. Great attention is given to the English railway stations. At Shrewsbury, for example, a city of half the size of our Hartford, or say 25,000 inhabitants, the station cost $500,000. Along the route a grade crossing is scarcely ever seen; when it is, the gate is kept shut, except when some one wants to cross the track. Its normal condition is to be closed. Tunnels and bridges are frequent. Over these in many places ivies are grown, and other climbing vines; and at many stations the cultivation of flowers, stimulated by prizes offered by the companies, has been carried to an art. Crossing the tracks at stations is not feasible, and walking on the tracks through the country is forbidden. Look from the car window half a day and you see no one on the track except an occasional railway employé. The whistle scarcely ever blows except at stations. The guard notifies the engineer that all is ready by blowing a shrill little whistle which he carries in his pocket. The engineer pipes a shrill answer from the locomotive whistle, and off you go, quietly and without the infernal bell-ringing and yelling and leaping on the last car that we are used to. The cars at home are all lettered in large letters with the name of the company that owns them. Here there is never any of that. When now and then one is marked, the lettering is small and hid away in some scroll on the door. But the distinctions of first, second and third class are marked very clearly in large type over the door of each compartment. Sometimes they have also another mark. If a compartment is secured before the train leaves they fasten on its window a printed card labeled "Engaged." The other day I saw a party of girls shut up in one of these railway carriages, and neatly marked in that way, "Engaged." They looked satisfied.

Railways in Great Britain.

A PAPER read in London recently by Mr. Edward J. Waterston gave some interesting statistics of railways in Great Britain. In 1840, said the essayist, there were but 1,435 miles of railway in the United Kingdom; in 1850 they had risen to 6,621 miles; in 1860 to 10,433 miles; in 1870 to 15,237 miles; in 1880 to 17,933 miles; and now, according to the latest returns issued, the United Kingdom alone possesses 18,457 miles of iron highway. (It should be borne in mind that double tracks are counted as single in Great Britain and Ireland, so that according to the method of railroad measurement adopted in this country, the total length of miles would be much larger). But, if astonished at the progress of the construction of railways, we should be more astonished at their results. We had now, as had been said, 18,457 miles of railway, constructed at a cost of £767,899,570, carrying, exclusive of 599,568 season ticket-holders, some 654,838,295 passengers (37,204,569 first-class, 66,695,817 second-class, and 551,937,909 third-class), and, in addition, 256,215,833 tons of goods, the receipts from the former being £28,796,813, and from the latter £37,740,315; the working expenses being £36,170,456, net earnings £33,206,668, and earnings on capital 4.32 per cent. Roughly speaking, about five-eighths of the railways of the United Kingdom, with their invested capital, belonging to England and Wales, two-eighths to Scotland, one-eighth to Ireland. Looked at superficially, the number 655,000,000 passengers carried in one year might seem large, but in reality it was not so, when the figures were properly analyzed. The population of the United Kingdom was, roughly speaking, 35,000,000; therefore, the total railway traffic was something less than 19 times the population. The traffic on many lines traversing, it might be, thickly populated parts of the country, was double, treble and fourfold that amount.

Steam Whistles.

A CORRESPONDENT of the *Railroad Gazette* recommends a steam horn instead of a steam whistle. He says that "as a general rule the steam whistle must be very powerful to be effective beyond half a mile. Now, if instead of a whistle a horn were to be used, the gain in useful effect would be great, while the disagreeableness of tone would be much, if not entirely reduced. The form of such a horn with a mouth-piece or forcing tube would be extremely simple, of inconsiderable expense (less than that of the ordinary whistle), and instead of the screeching sound of the latter, it would yield the mellower tone of the modern tuba or cornet-a-piston, to which we suppose most persons will not object." There seems to be a good opportunity here for some ingenious person to exercise his inventive talents.

WORN OUT RAILWAY EMPLOYÉS.—By the way, I was speaking to a very intelligent station-master the other day about the crop of holiday railway accidents. "Do you think," I said, "it has much to do with the long hours?" He at once replied, with the utmost warmth and eagerness, "Sir, you can take your stand upon that. If you are ever in company where that question is started you will be right in denouncing the long hours. No one will be able to reply to you then. Undoubtedly, the men are worn out, oppressed, and fatigued beyond all powers of attention. Look at that poor fellow in yonder signal-box," and he pointed to one hard by: "he has been there for twelve hours at a stretch—every day it is the same thing. That man has not even time to snatch a quiet meal, no rest, dare not relax for a minute. Well, what's the consequence? Some break down and die off, others go off their heads, and you never can tell when the break-down is coming. The men won't give in—it's their bread; the station-master daren't complain, and the directors know it. They don't care for the public safety; they can afford the damages. Human life is nothing to them, nor human hearts and brains either. "The thing," he added, "is scandalous, shameful, notorious." At that moment an express was sighted; his quick eye caught the pointsman flagging. "John, look sharp!" and he hurried off. "John" was in time, but only just. The train flew by like a hurricane, and "John" lounged away languidly with his hands in his pockets, looking fit for the hospital.—*London Truth.*

THE Eames Vacuum Brake Company, Watertown, New York, has issued a pamphlet explaining the peculiarities of its system. Apart from the interest of the subject, which is treated with skill and adequately illustrated, this production is desirable for the remarkable beauty of its letterpress and general appearance.

Northern Pacific Railroad.

THE following is a comparative statement of the earnings, operating expenses, etc., of the Northern Pacific Railroad for the years ending June 30, 1882 and 1883:

Earnings:	1882.	1883.
From freight	$3,909,424 20	$5,409,080 67
" passengers	1,302,260 80	2,099,745 81
" mail	52,306 56	87,281 62
" express	149,293 18	229,259 22
" miscellaneous	17,021 82	30,091 94
Total earnings	$5,430,305 56	$7,855,459 26
Operating expenses:		
Conducting transportation	$ 749,630 31	$1,240,526 96
Motive power	967,694 74	1,579,529 68
General expenses	268,508 50	299,909 90
Maintenance of road and structures	952,919 56	1,393,711 06
Maintenance of cars	273,975 45	439,389 22
Rentals and taxes	315,111 95	383,862 95
Total expenses	$3,572,840 51	$5,336,929 77
Net earnings	$1,857,465 05	$2,518,529 49

—to which add dividends on investments in 1883, $12,024, making a total of $2,530,553.49, from which deduct twelve months' interest on funded debt, $1,209,837.53; six months' interest on dividend scrip, $139,224.63; adjustment of sundry accounts and claims against United States Government, $31,908.21—leaving a balance of $1,149,583.12.

Compared with the year 1881-'82 the gross earnings show an increase of $2,425,153.70, or 44.66 per cent., with an increase in expenses of $1,764,089.26, or 49.37 per cent., making the increase in net earnings $661,064.44, or 35.59 per cent. The ratio of expenses to earnings was: in 1881-'82, 65.80 per cent., in 1882-'83, 67.94 per cent—an increase of 2.14 per cent.

The average number of miles of road operated in 1881-'82 was 797; do. in 1882-'83, 1,497—an increase of 700 miles.

The gross earnings per mile of road in 1881-82 were $6,318.85, the expenses (including rentals and taxes) $3,830.46, and the net earnings $2,488.89; in 1882-'83 the gross earnings per mile of road were $5,247.47, the expenses (including rentals and taxes) $3,565.08, and the net earnings $1,682.39—showing a decrease in gross earnings per mile of road of $1,071.38, with a decrease in expenses of $265.38, making the decrease in net earnings $806.

While a satisfactory increase is shown in the earnings per mile of the older portions of the road, the ratio of earnings to total mileage was necessarily less for the past than for the preceding year, from the fact that of the 700 additional miles of road operated, nearly 600 traversed regions where settlement and business had to be created by the road as it advanced. Now that a connection of the tracks has been effected, and the line opened for through traffic to and from the Pacific Coast, the earning capacity of this large mileage will soon be demonstrated. It should further be borne in mind that all portions of this new mileage run through a country abounding in natural resources, and certain to develop a steadily increasing local business. The above exhibit must therefore be held to be gratifying for a company pushing its tracks from the two sides of the continent through regions scantily peopled or entirely unsettled, to a connection in the Rocky Mountains, and dependent for its earnings wholly upon its local traffic until that connection was made. It is also an encouraging indication for the future, and serves as a guide to a just estimate of the income that may be expected with the completion of the line as a direct route to the Pacific coast, and with the fuller development of the immense regions to which the Northern Pacific furnishes the only means of communication by rail.

The number of passengers arriving on the company's lines at the eastern terminal stations, viz.: St. Paul, Minneapolis, Duluth and Superior, in 1882-'83 was 62,329; and the number departing therefrom, 75,739—a difference of 13,410. The total number arriving and departing was 138,068, against 106,886 in 1881-'82—an increase of 31,182.

The number of through passengers (from and to other roads) carried on the eastern divisions in 1882-'83 was 32,489, of whom 11,952 were first class, and 20,537 second class and emigrant; the number of local passengers carried was 418,498, of whom 346,752 were first class, 31,501 second class and 40,245 commutation—total through on local, 450,987, against 297,680 (19,446 through and 278,214 local) in 1881-'82, an increase of 153,307. The number moved east in 1882-'83 was 198,475; do. west, 252,512. The number moved east in 1881-'82 was 134,165; do. west, 163,515. On the western divisions the number of through passengers was 26,872; local do. 73,291—total, 100,163, of whom 52,982 were carried east, and 47,181 west. The difference in the number of passengers carried eastward and westward on the eastern divisions was in 1882-'83 54,037 and in 1881-'82 19,350, representing largely, though not directly, the immigration into Northern Minnesota, North Dakota and Montana. The increase in the passenger earnings of these divisions was 42.6 per cent.

The number of miles traveled by through passengers on the eastern divisions in 1882-'83 was 10,591,423; do. by local passengers, 37,596,459—total, 48,187,882. In 1881-'82 the number of miles traveled by through passengers was was 5,699,647; do. by local passengers 28,629,371—total, 34,329,018; showing an increase in through passengers of 4,891,776, and in local passengers of 8,967,088—a total increase of 13,858,864. On the western divisions the number of miles traveled by through passengers was 2,632,235; do. by local passengers 3,589,665—total, 6,221,900.

The number of tons carried eastward in 1882-'83 on the eastern divisions was 257,280; do. westward 532,726—total, 790,006. In 1881-'82 the number carried eastward was 169,866; do. westward 485,209—total, 655,075; showan increase in tons eastward of 87,414; do. westward 47,-517—total, 131,931. On the western divisions the number of tons carried in 1882-'83 was 303,330, of which 132,341 was east bound, and 170,989 west bound.

The number of tons carried one mile east on the eastern divisions in 1882-'83 was 59,220,256; do. west 159,-336,992—total, 218,557,248. In 1881-'82 the number carried east was 39,518,027; do. west 142,333,510—total, 181,-851,537, showing an increase in the freight movement of 36,705,711, of which 19,702,229 was east bound, and 17,-003,482 west bound. The number of tons carried one mile on the western divisions in 1882-'83 was 25,002,438, of which 15,497,462 was east bound and 9,504,976 west bound.

The average haul for each ton of freight on the eastern divisions in 1882-'83 was: east bound, 230.2 miles; west bound, 299.1—both divisions, 276.7. On the western divisions the average haul was: east bound, 117.10 miles; west bound, 55.59 miles—both directions, 82.42 miles.

The increase of east bound freight tonnage on the eastern divisions was 51.45 per cent., and of west bound 979 per cent., the total increase being 20.60 per cent. The increase of freight earnings on these divisions was $869,393,92.

On the western divisions both passenger and business show a steady and important growth. On the Pacific division, including the Cascade Branch, the gross earnings increased from $272,676.90 in 1881-'82 to $420,871.79 in 1882-'83, a gain of $148,194.89, or 35.2 per cent. At the same time there was a decrease in operating expenses of $23,645.85, or 8 per cent.

The Pend d'Oreille division did not come into the hands of the operating department until May, 1882, and comparison cannot be made between the earnings of this year and last. The other divisions of the road west of the Rocky Mountains have only been operated a few months. On this portion of the main line, extending from Wallula to a point in the Flathead Reservation, the gross earnings were $816,884.79, and the net earnings $269,753.54. This is considered an excellent exhibit in view of the fact that a large part of the mileage is new road, through a wild region just beginning to attract settlement and develope traffic-producing industries.

The quantity of wheat moved during the year over the eastern divisions was 5,102,368 bushels, or 153,071 tons, an increase of 36,271 tons over the previous year. The grain elevators on the line of the road have a total storage capacity of 6,035,000 bushels.

Arrangements have been made for the transportation of grain in bulk from Eastern Washington and Oregon to Tacoma, and for sacking it for shipment at that place. The completion of the Portland-Kalama line, and the establishment this fall of the transfer ferry across the Columbia, near the latter place, will open a large grain traffic between the interior and Puget Sound, thus adding to the freight department a new and important source of earnings.

The shipments of coal from Carbonado, on the Cascade Branch, during the year were 82,012 tons, and from South Prairie, 10,257 tons. The present output of the Carbonado mines is about 600 tons a day, and this will shortly be increased to 1,000 tons. The coal mines at Wilkeson have recently been reopened by the Oregon Improvement Co., and will soon make daily shipments.

The ten refrigerator cars have earned during the eight months that they have been in service $14,796.90, the total expenses including interest on cost and allowances for depreciation being $7,405.

On the 4th of July last, 511 tons of silver bullion were shipped east from Helena (the center of mining for the precious metals east of the Rocky Mountains) in a single train, and the Barker mining district, north of Billings, is beginning to send its products over the road. During the past few months it has shipped from Billings about 250 tons. The transportation of bullion and machinery and supplies for the Montana mines will form an important item in future freight reports.

During the present season, 40,000 head of young cattle have been carried over the road to Montana. The shipment of wool this season will be nearly, if not quite, one million pounds.

The gross earnings of the express business carried on by the company were $229,259.22, the expenses $80,475.20, and the net earnings $148,784.02, an increase over the previous year of $45,848.83, or 44.5 per cent. In the expenses are included the entire outlay for equipment, on office furniture, on fixtures at St. Paul and Minneapolis, amounting to $17,014. The service was extended during the year over 560 additional miles, and 33 new offices were added.

The Northern Pacific Express Company, whose immediate purpose is to carry on the express business over this company's roads and connecting lines of transportation, was recently incorporated and organized under the laws of the State of Minnesota. It began business on the 1st of September, 1883.

During the past year 293 miles of new telegraph poles have been erected on the main line. The company now have 1,191 miles of poles on the main line, not including 98½ miles, used jointly with other companies, and 308½ miles on branch lines; 974¾ miles of wire have been strung under contract with the Western Union Company —199¾ miles of exclusive Western Union wires and 782 of exclusive railroad wires. There are on the line 154 offices and 194 operators. The cash receipts from commercial business during the past year were $72,594.88 against $45,695.70 during the previous year, an increase of $26,899.18—which increase was more than the total business of 1881.

The large increase in the mileage of road operated has necessitated a corresponding increase in equipment. At the close of the year ending June 30, 1883 (there having been added during the year, 131 locomotives, 71 cars for passenger and 2,395 for freight service), the company had 289 locomotives, 21 first-class, 37 second-class, and 15 third-class passenger cars, 2 chair cars, 7 emigrant, 8 dining, 16 sleeping, 6 business, 1 pay, 5 observation, 24 combination, 15 express, 17 baggage, and 7,500 freight cars. The net expenditure for equipment during the year was $1,604,916.37.

The total expenditure under the head of improvements and betterments during the year was $2,013,966.61, viz.: new buildings and grounds, water stations, stock yards, coal bunkers, new tools and machinery, etc., $861,706.38; road bed, $158,696.09; cost of steel rails over iron, $581,833.34; new side track and turn-tables, $156,776.79; new bridges and trestles, $1,213.85; new fences, $10,236.68; new telegraph line, $10,538.32; tree planting, $21,354.01; east approach to Bismarck bridge, $4,573.25.

It will be seen that a large item in this account is for replacing with steel the iron rails on the older divisions of the road. The mileage of track thus relaid with steel during the year was as follows: St. Paul division, 54½ miles; Minnesota division, 61½ miles; Dakota division, 68¼ miles; Missouri division, 22 miles—total, 206¼ miles. In addition, 28 miles of side track were built, 53½ miles of road ballasted, 153 bridges and 27 buildings rebuilt, 18 buildings enlarged, and 8 new stock yards constructed. The expenditures at Tacoma for coal bunkers, shops, wharf and other improvements were $237,372.91.

Coal of excellent quality has been discovered in the Bull mountains, about 30 miles north of Billings, Montana. Actual tests with this coal in locomotives show that four tons are the equivalent of three tons of the best Pittsburgh coal, burned under like conditions. The veins are 14 to 24 feet thick, and are estimated to underlie 25 square miles, and should yield 10,000,000 tons to the square

mile. The deposits of coal are found just where it is most needed for the economical operation of the road. It can be put upon the cars at $1 per ton, and delivered on the main line at a cost of $1.50 per ton.

At the commencement of the fiscal year 1882-'83 the ends of the track on the main line were 564 miles apart. They were advanced during the year: from the east 293½ miles, and from the west 166½ miles—a total of 450 miles; to which add 307 miles of track laid on branch lines—making the grand total for the fiscal year 757 miles. Since the close of the year, and up to September 15, 1883, 284 miles of additional track (including the 114 miles of main line, which were completed on the 22d of August), have been laid on the main line and branches, making 1,041 miles for the period beginning July 1, 1882, and ending September 15, 1883.

The amount expended for construction during the year ending June 30, 1883, was $19,422,720.07; to which add amount previously expended (from March, 1879, to June 30, 1882), $28,949,302.28—making the total amount to the close of the last fiscal year, $48,372,022.35.

Referring to the tributary or branch lines, the report says that the track has been laid on the Seattle Branch to a point about 25 miles from Tacoma and 15 miles from the junction with the Cascade Branch. Grading is well advanced on the remainder of the line, and it is expected that the track will all be down before the winter season begins.

The line of the National Park Branch was located in October, 1882. It leaves the main line at Livingston, and runs up the Yellowstone River to the northern boundary of the National Park, a distance of 51 miles. The work was commenced last spring, and was completed in August.

Track was laid on the Palouse Branch, prior to the end of the fiscal year, from Palouse Junction eastward, a distance of 32 miles. It has since progressed a further distance of 60 miles, The road will soon be opened as far as Colfax, and will be completed in 1884.

At the commencement of the fiscal year, 55 miles of track had been laid on the Little Falls and Dakota Railroad. During the year the line to Morris, 87¾ miles, was completed and put in operation.

Track laying on the Northern Pacific, Fergus and Black Hills Railroad has now reached a point 40 miles west of Breckenridge. About 2½ miles of additional grading is ready for the rails, and the track will soon be put down, thus reaching the terminus at Milnor, 117 miles from Waldena.

The Fargo and Southwestern Railroad has been completed to its terminus at La Moure, on the James River, a distance of 87½ miles from Fargo.

The Jamestown and Northern Railroad leaves the main line one mile west of Jamestown, and runs in a northerly direction 95 miles to the west end of Devil's Lake. Track laying began in August, 1882, and had progressed as far as Carrington, 42 miles, at the beginning of winter. The grading is nearly completed to the Lake, and the track will soon be laid. A survey has been made for an extension of the line to the Dominion boundary. A line from Carrington northwesterly to the Mouse River has also been surveyed. A short spur, called the Sykeston Branch, was located from Carrington to the west line of Foster county in May, 1883, and the track was completed to Sykeston, 13 miles, on the 1st of September.

From the report of the Land Commissioner it appears that there were sold during the year ending June 30, 1883, 761,236.24 acres and town lots for $3,392,831.78. The average price per acre was $4.02, against $3.26 during the previous year.

GENERAL REVENUE AND INCOME ACCOUNT.

Balance July 1, 1882		$3,039,923 49
Received from earnings	$7,855,459 26	
Received from Land Department	1,511,316 14	
Received from miscellaneous	12,249 00	
		9,379,024 40
Received from proceeds of bonds	$18,500,000 00	
Received from preferred stock sold	757,169 86	
		19,257,169 86
Received from loans for construction		5,452,081 56
Total		$37,138,199 51
Expended for operating expenses		$4,953,056 82
Expended for rentals and taxes		383,862 95
Expended for interest	$1,209,837 53	
Expended for int'st accrued on dividend scrip.	139,224 63	
		1,349,062 16
Expended for preferred stock and bonds canceled		253,968 30
Expended for Land Department expenses and surplus for retirement of bonds		1,257,347 84
Expended for construction	$16,370,905 81	
Expended for new equipment	1,604,916 37	
Expended for improvements and betterments on old road	2,013,966 61	
Expended for material	247,281 16	
Expended for interest	604,918 76	
		20,841,988 71
Expended for advances repaid		4,593,946 02
Cash reserved for interest, uncalled for and accruing		2,275,651 96
Cash in hands of treasurer and disbursing officers		1,219,304 75
Total, as above		$37,128,199 51

CONDENSED BALANCE SHEET, JUNE 30, 1883.

Railroad, equipment and lands		$149,693,519 80
Cash in hands of treasurer applicable only to retirement of bonds		486,386 01
Northern Pacific R. R. Co's stock and other investments	$3,424,534 05	
General supplies on hand, including construction material	4,506,341 05	
Accounts receivable	2,573,058 38	
Cash in hands of treasurer	3,375,398 36	
		13,879,331 84
Total		$164,059,237 65
Capital stock:		
Common		$49,000,000 00
Preferred	$51,000,000 00	
Less canceled by land sales	9,250,536 10	
		41,749,463 90
		$90,749,463 90
Funded debt:		
Missouri division bonds	$2,500,000	
Less canceled	111,400	
	$2,388,600 00	
Pend d'Oreille division bonds	$4,500,000	
Less canceled	997,400	
	3,502,600 00	
General first mortgage bonds	33,361,000 00	
		39,522,200 00
Bills payable and advances on general mortgage bonds		7,662,501 92
Matured payments on contracts		2,600,600 89
Loans for construction purposes		5,452,081 76
Interest accrued to date	$1,092,158 63	
Coupons not presented	6,741 50	
		1,098,900 13
Net proceeds of land sales in preferred stock, bonds and cash		11,183,084 73
Dividend scrip		4,640,821 20
Profit and loss		1,149,583 12
Total, as above		$164,059,237 65

President.—HENRY VILLARD.

Vice-President.—THOMAS F. OAKES.

Second Vice-President.—ANTHONY J. THOMAS.

Directors.—Frederick Billings, Ashbel H. Barney, John W. Ellis, Rosewell G. Rolston, Robert Harris, Thomas F. Oakes, J. Pierpont Morgan, Henry Villard, August Belmont, New York; J. L. Stackpole, Benjamin P. Cheney,

Boston; John C. Bullitt, Philadelphia; Henry E. Johnston, Baltimore.

Secretary.—SAMUEL WILKESON.
Treasurer.—R. LENOX BELKNAP.
Land Commissioner.—C. B. LAMBORN.
Engineer-in-Chief.—ADNA ANDERSON.
General Manager.—HERMAN HAUPT.

Our English Letter.

WRITTEN SPECIALLY FOR THE AMERICAN RAILROAD JOURNAL.

PROBABLY not a few of your readers have visited Southport, in Lancashire, distant only a few miles from Liverpool, and a town one does well to see and better to live at for a time during the summer months. It is a resort not ranking with the best, but able to boast of many pretty houses, good streets, with pretty gardens fronting the houses, a fine hotel or two, a magnificent aquarium, splendid pier and other features, which render it desirable as a temporary place of residence. Its present claim to prominence rests upon the meetings of the British Association, which learned body assembled for its meeting of 1883, in the town aforesaid, September 19. Approaching twenty-three hundred tickets were sold before the office was closed on that day, and the figures afterwards reached 2,696. Two of the papers read at the meetings of the Association are of special interest to your readers, but the first of these is so certain to attract your editorial attention, that I need scarcely do more than mention it, as you are sure to publish at least a condensed report of it. I refer to a "deliverance" by Mr. James Brunlees, president of the Mechanical Section, in which he described the growth of mechanical appliances for the construction and management of railways and docks. The learned speaker having said that the railway of the present day is in principle what it was at the outset, proceeded to express the difference in detail between now and then, by the use of a simile which, as you may be sure, did not fail to engage the closest attention of the ladies present. The railway of to-day, he said, differed in detail from that of the original railway as much as, or more than, the skewer which fastened the dresses of the ladies of Queen Elizabeth's time differed from the pin of the present day, or the carpets of this day from the rush-strewn floors of that. Speaking of the ladies reminds me that Mr. Brunlees paid a very high compliment to one of your fair American women in the course of his address, His words were: "Women now take their place regularly in the ranks of several scientific professions, and though they have not shown any desire to enter that of engineering, there has recently been an example of their capability in that direction. It has been publicly stated that Colonel Roebling, the distinguished engineer of the Brooklyn Suspension Bridge, which is one of the most remarkable works of the age, was assisted during a long illness in carrying out his work by the talent, industry, and energy of his wife, who acquired theoretical and practical knowledge enough to aid in seeing that her husband's design was properly carried out. This example is worthy of mention as honorable to the individual woman, to the energetic nation to which she belongs, and to the better half of the human race." I leave you to the task of informing your readers on the various matters of invention dealt with in order by the learned speaker, and will content myself with dismissing the meeting of the British Association in another line or two.

On the third day of its proceedings Mr. Trelawney Saunders introduced what proved to be a very lively discussion, by reading a paper on the project for connecting the Mediterranean with the Red Sea by a navigable canal through the Jordan Valley. He thought this scheme practicable, although very difficult, between the Dead Sea and the Akaba arm of the Red Sea. For 147 miles the channel would be an inland sea about ten miles wide, except that for eleven miles it would be three miles wide. The scheme, I need not say, is revived in consequence of the difficulties as to the Suez Canal, about which England and France were so excited of late. It received rough treatment from several able and animated speakers, one of whom insisted that the equilibrium of the earth's surface would be disturbed by introducing into the valley an enormous volume of water. While, perhaps, not agreeing altogether with the argument of the *Times* newspaper as to the total absurdity of the Jordan Canal Scheme, from the standpoint of business expediency, and being entirely non-committal on the Thunderer's position as to the irreverence, not to say wickedness, of changing the geography of the Holy Land, I must say that the idea of giving Mother Earth an unfilial tilt is to me a shock which I am vain enough to believe is shared by all well-regulated minds.

Great enthusiasm was evoked at a later meeting of the Association, when, after the recital by Mr. H. H. Johnson, of his visit to Stanley's stations on the Congo River, a letter was read from the explorer, written in his best vein, urging England to see to it that "neither French nor Portuguese, nor any other particular nation, should defraud her of her rights and privileges in Africa, in broad daylight."

The electric railway at Brighton, now a quarter of a mile long, will, probably, be extended the whole front of the town under the Esplanade wall, a distance of two miles, when cars will be run in both directions every ten minutes. To add to its value, the provision of an electric hoist is projected, conveying passengers up the face of the eastern wall, a height of sixty-two feet. The speed made on the line is five miles an hour up an incline of one in a hundred, and the return ten miles per hour. As many as sixteen adult persons, besides the driver, have been carried in the car now in use, which runs on a twenty-four inch gauge, and is lighted at night by a twenty-candle Swan lamp.

The newly-enacted Patent Bill is passing through a fire of criticism, but, with all its possible imperfections, will answer the intention of the government, to protect and encourage inventors, especially by the reduction of fees. That it does not go far enough may be conceded, but, I submit, this is a mistake on the right side. I am told that in your country a man can hardly "whittle" a stick without infringing on somebody's patent. For four pounds, instead of twenty-five, as under the old law, the inventor insures the protection of his device for the period of four years. If, after this period, he shall pay ten pounds each year for four years longer, protection is extended to him for that time, making eight years thus far. The fees for the next two years are an annual payment of fifteen pounds; and after the tenth to the end of the fourteenth

year, twenty pounds per year. Then the term of protection ceases.

While on the subject of patents, a new invention, patented by Messrs. Bennett & Rosher, of Church street, Chelsea, London, is remarkable. The patentees call it "The Cylindrical Compartment Safety Railway Carriage." It provides that in the place of the ordinary coach, there shall be placed on the ordinary wheeled bogie, cylindrical compartments, say three in number, disposed transversely, as are the compartments now in service. The object of this arrangement is that, in case of collision, its force shall be broken by the rising of the central cylinder, thus preventing the telescoping of the train. It is proposed to place one or more of these singular coaches at each end of the train. You perceive that the passengers riding in the cylindrical compartments will share in the honor of preventing possibly serious disaster by, in the first place, riding in a place shaped like a boiler, and, secondly, by heroically receiving the first shock of the colliding body in case of collision.

Colonel Beaumont, who once sat in the House of Commons as member for South Durham, is finding not less glorious distinction in the pursuit of engineering. His boring machine, now employed in the tunnels on the Mersey Railway, is making seven feet in eight hours. In chalk, the cutters excavate fifteen feet before being changed, and in the Mersey sandstone from three inches to eighteen inches without renewal. The gallant colonel promises that his new machine, now being built, will drive headings at the rate of eight yards in twenty-four hours without the use of explosives.

You will do wisely to make a note of a coming publication, "The Railway Companies Directory," to be distributed in December next, which will give a list of directors, officers, and agents of the railways of the United Kingdom, with capital, working expenses, and revenue, prices of stocks, dividends, mileage, and weekly traffic, and receipts during the past five years. It is being edited by Mr. Percy Lindley. The book will, doubtless, be of great value to railroad people everywhere.

H. A. L.

HARD ON THE CITY MAN.—Twenty-five years ago, says a writer in *Harper's*, few pedestrians really knew anything of this country (near Catskill village, New York), and a story is related of an ardent New Yorker who visited the region with an old Catskillian, and who was thoroughly enchanted by all he saw. The guide, though loving his rugged, beautiful native land, was rather bored by the visitor's enthusiasm, especially when he was forced to wait while nobly sounding verses rose to the tourist's lips. Finally he turned upon him with, "Come from New York, don't you sir?" "Yes," was the answer. "Wa'al I'd like t'know what *you'd* say if I went down thar and *gawked* around like you do up yere."

INSIDE a Canadian farm house inspected by a writer in *Harper's Monthly*, a vial of holy water with a sprig of spruce always hangs on the wall, and the wife before stepping into bed sprinkles the sheets with it. A Protestant husband who did not relish this benediction retired first one night with an umbrella, and raised it till the Catholic shower had passed.

TRADE NOTES.

THE Gilbert Car Manufacturing Company, of Troy, N. Y., has taken a contract for five hundred freight cars for the government railways of Chili, South America. They are to be fitted with the Westinghouse freight brake. One hundred and fifty of them are nearly ready to be shipped.

BOWERS, DURE & COMPANY shipped two first-class passenger cars and one postal and one baggage and express car to the Georgia Pacific railroad on the 9th inst.

THE heavy steel caps for the steel tower of the Michigan Central Railroad bridge over the Niagara River are being placed in position. There are four of these caps for each tower. They were cast by the Cambria Iron Company, and are said to be the largest steel castings ever made in this country.

THE Jackson & Sharp Company have just shipped three passenger cars to the Railway de Sabanilla y Maroto, of Alabama.

THE Pittsburgh Bessemer Steel Works, located at Homestead, were sold on the 16th inst. to Carnegie Bros. & Co., of the Edgar Thompson Steel Company. The basis of the sale is said to be $1,200,000.

THE Union Pacific railway company's land sales since January 1 last, have been 721,928 acres which sold for $2,647,592.

THE Harlan & Hollingsworth Company has been awarded the contract for building a state railway carriage and a sleeper for the President of the Argentine Confederation, and the Jackson & Sharp Company has received an order for the construction of three sleepers for His Excellency.

THE proprietors of the Detroit Steel Works and the Detroit Car Spring Company, No. 2 Moffat Building, Detroit, announce that they have on exhibition at their Chicago office, No. 103 Adams street, both spring steel and coil and elliptic springs of their own manufacture. Their representative at this address shows the above articles and tests of the same, and railroad men visiting Chicago are invited to call and see him.

WE commend attention to a pamphlet issued by the manufacturers of the Clayton Improved Air Compressors, the Clayton Steam Pump Works, Nos. 45 and 47 York street, Brooklyn, N. Y. It contains finely illustrated descriptions and a price list of the variety of compressors, suitable for many purposes, turned out at their shops. As our readers are aware, compressed air as a motor for working rock-drills and water-pumps in mines and tunnels, coal-cutting machines, under-ground hauling and hoisting engines, for driving mine locomotives, for sinking caissons for piers of bridges, for refrigerating purposes, for the pneumatic transmission of messages, etc., has come into general use. Its advantages over steam, when employed in a confined space, as in a mine or tunnel, together with the remarkable sanitary effect produced by its introduction, furnishing at all times a supply of pure, fresh air to the miners, have resulted in the fact that air-compressing machinery is now employed in many of the mines and on all of the great engineering works in this country where it can be effectually used. The Clayton Air Compressors are said to be especially well designed, and have been used for all of the above purposes.

Some Choice Military Recollections.

"RECOLLECTIONS of a Drummer-Boy," in the September *St. Nicholas*, contains several quotable passages. For example, the following: The chaplain, it should be said, made some pretension to literature, and considered himself quite an authority in the camp on all questions pertaining to orthography, etymology, syntax, and prosody, and presumed to be an umpire in all matters under discussion in the realm of letters. So, when he came into the sutler's tent, Captain K—— exclaimed: "Good evening, Chaplain, you're just the very man we want to see. We've been having a little discussion here, and as we saw you coming, we thought we'd submit the question to you for decision." "Well, gentlemen," said the chaplain, with a smile, "I shall be only too happy to render you what assistance I can. May I inquire what is the matter in dispute?" "It is but a little thing," replied the captain. "You would, I suppose, call it *more a matter of taste* than anything else. It concerns a question of emphasis, or rather, perhaps, of inflection, and it is this: Would you say, 'Gentlemen, will you have a cig-ár?' or 'Gentlemen, will you have a cig-ár?'" Pushing his hat forward, as he thoughtfully scratched his head, the chaplain, after a pause, responded: "Well, there doesn't seem to be much difference between the two. But I believe I should say, 'Gentlemen, will you have a cig-ár?'" "*Certainly!*" exclaimed they all, in full and hearty chorus, as they rushed up to the counter in a body, and each took a handful of cigars with a "Thank you, Chaplain!" leaving their literary umpire to pay the bill—which, for the credit of his cloth, I am told he did.

The writer's recollections of cooking in the army are amusing. He says: At first we tried a company cook; but we soon learned that the saying of Miles Standish—"If you want a thing to be well done, you must do it yourself; you must not leave it to others"—applied to cooking quite as well as to courting. We therefore soon dispensed with our cook, and though, when we took the field, scarcely any of us knew how to cook so much as a cup of coffee, a keen appetite, aided by that necessity which is ever the mother of invention, soon taught us how bean soup should be made, and hard-tack prepared. As I write, there lies before me on my table an innocent looking cracker, which I have faithfully preserved for years. It is about the size and has the appearance of an ordinary good biscuit. If you take it in your hand, you will find it somewhat heavier than an ordinary biscuit, and if you bite it—but no; I will not let you bite it, for I wish to see how long I can keep it. But if you were to reduce it to a fine powder, you would find that it would absorb a greater quantity of water than an equal weight of ordinary flour. You would also observe that it is very hard. This you may, perhaps, think is to be attributed to its great age. But if you imagine that its age is to be measured only by the years which have elapsed since the war, you are greatly mistaken; for there was a common belief among the boys that our hard-tack had been baked long before the commencement of the Christian era! This opinion was based upon the fact that the letters B. C. were stamped on many, if not, indeed, all of the cracker boxes. To be sure, there were some skeptics who shook their heads, and maintained that these mysterious letters were the initials of the name of some army contractor or inspector of supplies, but the belief was wide-spread and deep-seated that they were certainly intended to set forth the era in which our bread had been baked.

Slovenly Reading.

WE must warn all men, old and young, against an evil thing which has been described as the "prevailing pestilence of slovenly reading." This pestilence has lain low many a one who began life with excellent prospects. It is ruinous both to mind and morals. It is apt even to injure a man's business habits, and prevent him from winning success in practical affairs. In time it will confound all his faculties. It will destroy his capacity for clear perception, for precise thought and for proper reasoning. It will throw into confusion his judgment and his memory. If he does not get rid of it he can never become a good writer, or do any literary work of any kind worth looking at. How many slovenly readers are to be found in these times. They will, in their slovenly fashion, read a newspaper article, perhaps a very excellent one, and when they have got to the end of it, or, as they say, when they have "looked through it" or "glanced over it," you will find that they are unable to give any accurate account of its argument, or that they do not apprehend its fundamental points, or that they have lost one of its links, or that they have overlooked an important illustration, or that they have failed to seize a word which is the very hinge of the writer's thought, or that they have wholly misunderstood the drift and purpose of the article which they have wasted their time in glancing over. These slovenly readers are an affliction to careful and correct writers. When such a writer sees how his reasoning and his language are distorted by them, his mind is apt to become ruffled, and every one knows how a ruffled mind unfits a man for the work of perspicacious composition. We are of the opinion that the prevailing pestilence of slovenly reading is largely due to the slovenly way in which children are taught to read at school. Teachers must be very careful about this thing; they must teach their scholars to read with precision and understanding, thinking of every word, getting the sense of each sentence, and grasping the full meaning of any piece that may be before them.—*New York Sun.*

Paint for Floors.

A PAINT for floors, which economizes the use of oil colors and varnish, is described in the German technical press as having been devised by Herr Mareck. It is remarked that this paint can also be used on wood, stone, etc. For flooring, the following mixture has been found applicable: Two and one-eighth ounces of good, clear, joiner's glue is soaked over night in cold water. It is dissolved, and then is added (being constantly stirred) to thickish milk of lime heated to boiling point, and prepared from one pound quicklime. Into boiling lime is poured (the stirring being continued) as much linseed oil as becomes united by means of saponification with the lime, and when the oil no longer mixes there is no more poured in.

If there happens to be too much oil added, it must be combined by the addition of some fresh lime paste. For the quantity of lime previously indicated, about half a

pound of oil is required. After this white, thickish foundation paint has cooled, a color is added which is not affected by lime, and in case of need the paint is diluted with water, or by the addition of a mixture of lime water with some linseed oil. For yellowish-brown or brownish-red shades, about a fourth part of the entire bulk is added of a brown solution obtained by boiling shellac and borax with water. This mixture is specially adapted for painting floors. The paint should be applied uniformly, and is described as covering the floor most effectually, and uniting with it in a durable manner. But it is remarked that it is not suitable for being used in cases where a room is in constant use, as under such circumstances it would probably have to be renewed in some places every three months. The most durable floor paint is said to be that composed of linseed oil varnish, which only requires to be renewed every six or twelve months. It penetrates into the wood and makes it water resisting; its properties being thus of a nature to compensate for its higher cost in proportion to other compositions used for a similar purpose. Its use is particularly recommended in schools and work rooms, as it lessens dust and facilitates the cleaning of the boards.—*The Builder.*

THE JOURNAL has received a circular letter from the Chicago and Alton Railroad Company, under date of Oct. 1st, and issued by the General Freight Agent, Mr. H. H. Courtwright, announcing that Mr. S. H. Fulton has been appointed General Eastern Freight Agent, vice L. Fowler, resigned—to take effect immediately. Their New York office is No. 338 Broadway, which is a central location, and in the so-called "railroad district."

Mr. Fulton has been connected with the railroad business for many years, and until recently was with the Erie and Pacific Despatch, stationed at Chicago.

The Chicago and Alton represents about 1,000 miles of road, whose three chief points are Chicago, St. Louis, and Kansas City. The natural advantages which accrue to it from covering such a rich and flourishing section, are greatly enhanced by a wise, enterprising and liberal management. Its facilities for the passenger traffic are ample, and the travelers over it are sure of good accommodation, and what is of even yet greater importance, schedule time. The Pullman palace sleeping cars and the palace reclining chairs are run by them.

The freight department also shares in the general excellence observable on this road, and offers to shippers an unexcelled service for safety, speed and close attention to and watchfulness of their interests.

EAST of Cresson (in the Alleghanies) a profound ravine breaks its way wildly from the heart of the mountain to the lower valleys. It has acquired the name of Allegrippus, from an engine which fell over a fifty-foot embankment there thirty years since. The driver was Thomas Ridley, who still commands one of the Pennsylvania's locomotives. During the riots of 1877 an attempt was made to capture his engine, but he particularly insisted on running it without the aid of the mob, and it happened soon afterward that the company presented him with a gold watch and chain.—*Harper's.*

Growth of Railroad and Dock Appliances.

AT the recent meeting of the British Association, held at Southport, Lancashire, Mr. James Brunlees, F. R. S. E., read an address on the growth of mechanical appliances for the construction and working of railways and docks. We give a summary of the paper, clipped from *Engineering.*

The railway of the present day, Mr. Brunlees said, was in principle much as it was at the outset, but it differed in detail from the original railway as much or more than the skewer which fastened the dresses of the ladies of Queen Elizabeth's time, did from the pin of the present day. First the iron tram-plate had been superseded by the flanged rail, and to this had succeeded the smooth rail and flanged wheel. It had taken a long time to settle the form of the rail, and even now there was great diversity of pattern. As traffic increased, efforts were made to harden the surface of rails, and a system of steel plating for points and crossings was introduced in 1854 by a Mr. Dodds. In May, 1862, steel rails were laid down experimentally at Chalk Farm, and after outlasting sixteen lengths of iron rails, were taken out in August, 1865, after having been worn away only one-quarter of an inch on one side only. In 1866 the London and North-Western Railway had in use 3,000 tons of steel-headed rails, and fifty miles of steel rails. It was observed in 1876 that if, in order to fully realize the effect of the enduring quality of steel rails, it was necessary to take a given section of the busiest portion of one of our leading railways, over which upwards of 700,000,000 tons of live and dead weight pass annually, it would be found that the life of a steel rail on that portion of the line would be forty-two years if the traffic remained the same. This would reduce the cost of maintaining the permanent way of railways from 210*l.* to 106*l.* per mile. When it is considered that such a saving on a system of 500 miles, which at 25,000*l.* a mile costs twelve and a half millions, is 52,000*l.* a year, or about a half per cent. of the cost of the railway, it will be seen that, besides some increase of dividend to shareholders, no inconsiderable sum may be, and has been, devoted by the railway systems of Great Britain to the comfort of travelers; out of the saving effected by the introduction of steel rails. Turning then to signals, the speaker said that they were commenced in 1838 on the Grand Junction Railway, by the employment of a disk, which could be turned face or edgewise to the track. Distant signals were first employed in 1846 in Scotland, and probably the first distant signals of the semaphore type were those of the Great Northern, which were made in 1852. Automatic signals were tried with considerable care on the Brighton line, but were abandoned owing to practical difficulties in their working. The first instance of concurrent action between signals and switches was at the Bricklayer's Arms Junction in 1843. At East Retford a simple contrivance for interlocking the switches was introduced in 1852, and Mr. Ransome considers this the germ of the elaborate apparatus now used. With regard to the important question of brakes, it did not force itself upon public attention until competition increased the size and speed of trains. Means were sought to add to the control of trains, first, by using the power of the steam acting directly on the brakes; secondly, by the connection of several of the old brakes, so as to unite them under

the control of a single brakeman; and thirdly, by the introduction of brake apparatus connected with the buffers, so as to make the momentum of the train itself available in generating a retarding force, a result which has not been realized in practice. Colonel Yolland reported to the Board of Trade, in 1858, the result of a series of trials with brakes designed on these principles. The application of the brake to the engine was an old device, which had been abandoned on account of the injury it caused to the engine. Mr. McConnell, whose engine brake was tried by Colonel Yolland, endeavored to remove this objection by applying blocks to the rail instead of to the wheels of the engine, the block being forced down on the rail by means of an elbow joint. The second principle, the connection of several brakes united under the control of one driver, was chiefly represented by the invention of Mr. Newall. In this system two or more carriages, or, if necessary, the whole train, were fitted up with brake blocks, all of which were brought under the control of one guard by means of a longitudinal shaft, which transferred the motion of the guard's wheel to the brakes, throughout the whole length of the train. This principle has been applied in all good brakes since invented, however actuated; and it appeared to be a sound principle for the application of the retarding force. The speaker did not intend to enter into the controversy as to the best system of brakes, but there were several which were more or less effectual, and whereas trains which thirty years ago weighed on the average 30 tons, with engines of the same weight, running at thirty-five miles an hour, could scarcely be brought to a stand in a distance of 800 to 1,000 yards, now trains of twice or three times that weight, running at a much higher speed, could be brought to absolute rest in 20 or 30 seconds, and within a distance of 300 to 400 yards. The early locomotives were only designed to work on comparatively level lines and thus involved long detours or heavy works. Where neither of these were practicable, some other method of haulage had to be adopted, either the wire rope system or the central rail system. The former was employed by the speaker at the San Paulo Railways, where the ascent of 2,500 ft. in five miles was accomplished by four inclined planes, each with a gradient of 1 in 9¾, and of an average length of a mile and a quarter.

At the top of each bank-head, with an incline of 1 in 75 downwards, a stationary engine is placed. The wagons are attached to each end of the rope, and are raised and lowered simultaneously. On the lower half of each incline an ordinary single line is laid, and on the upper half, above the passing place, three rails are laid forming a double road, with a center rail common to both. Exactly half-way on each incline the single line of the lower half, and the three rails of the upper half, branch into a double way of sufficient length for the trains to pass each other. Each incline has a winding engine of 150 horse-power, and the ropes are steel wire, and 4 in. in circumference. The center rail system was designed by Mr. Fell, and first practically carried out under the speaker's direction over Mont Cenis. This, he said, was probably the most economical way of working very steep gradients under ordinary circumstances, and it has been found to answer very well, wherever it was efficiently carried out. Improvements in the means of cutting and tunneling were next adverted to, and the Diamond rock drill, the Brunton machine, and the Beaumont machine, were briefly described, as well as the steam navvy. In the matter of pile-driving, the speaker had employed several different methods. In fine sands, as at the Southport pier, he had used a disk pile, lowered into the sand by its weight as fast as the sand was removed from under it by a jet of water, and in hard shale he had adopted corkscrew piles. A revolution in driving timber piles was brought about by Mr. Nasmyth, who adopted the principle of his steam hammer to the purpose. His pile-drivers, generally in use, weigh about 24 tons; the boiler weighs 76 cwt.; the hammer weighs about 30 cwt., and delivers a blow every second, driving the pile 5 ft. to 10 ft. per minute, in ordinary soil. Iron cylinders were first used for foundations by Mr. Redman, on the Thames, at Gravesend, in 1842, and the first practical application of compressed air to the sinking of cylinders appears to have been made in 1839 at Châlons. Lord Dundonald had previously patented the same system in this country, where it was applied in constructing Rochester Bridge. Next Mr. Brunlees related the history of the machinery used in connection with docks and shipping, and concluded with an allusion to the electric railway.

Income Bonds.

One effect of the present shrinkage in Wall street will be to put income bonds out of fashion. Until the recent boom came in, when anything in the shape of a railroad bond was sure to be taken at some price, such a thing as an income bond was a rarity; and when found was the sequel of some foreclosure suit, where mortgage creditors had been content to relinquish the whole or part of their liens, and to take what was virtually a redeemable stock without voting power—under the name of an income bond. But recently the projectors of new roads have taken to issuing income bonds for construction purposes as a sort of make-weight, much like a chromo held up as as bait to lure capital. For example, the Central Ohio Railroad offered, for $600 cash, $1,000 first mortgage and $300 income bonds; and there are lots of income bonds on the stock list which have never had any equivalent in money paid in. It is noticeable that these are issued by new kite-flying financiers. The old conservative railroad men steer clear of such devices—they stick to stock or good mortgage bonds as resources for building.

We clip the following amusing article from "An unpublished chapter of Hawaiian History," published in the September *Harper's*. The writer had been engaged with others in preparing a document for presentation at the Foreign Office of the British government: "An amusing dilemma embarrassed us verdant diplomatists at the outset of our proceedings. As I had now, according to my instructions, become associated with Messrs. Richards and Haalileo, the dispatches were to be signed by all three of us. We pondered long over the momentous question as to how the Earl of Aberdeen should be addressed in them. The ordinary phrase 'My lord' seemed *singular* for a *plural* signature. The native chief suggested that '*Our* lord' would be proper. Our missionary associate thought that savored of irreverence. Another proposed '*O* lord,' which was open to the same objection. We finally surmounted the difficulty by considering that our three signatures together meant Kamehameha III., and began it 'My lord,' which passed muster with our Hudson Bay House censor."

Tramway.

[*The English nomenclature of "Tramway" is adopted in this department as being of greater convenience and more specific in its meaning than "street railway," though in alluding to individual organizations we shall preserve their corporate titles. It is our hope to nationalize the term Tramway, which is now generally used in every English-speaking territory with the exception of the United States.*]

THE CONVENTION.

IN another place we give a report of the first Annual Convention of the American Street Railway Association, which contains matter of great value to all persons practically interested in the business of providing cheap and comfortable means of city travel. Readers are respectfully referred to said report, which evidences that while on some points of importance, leading street railroad men are at variance, they are certainly a unit in the appreciation and enjoyment of the means to valuable coöperation afforded by the Association. The late convention was, in every sense, a success. It was a demonstration of the value of interchange of opinion, of the presentation and discussion of numerous experiences in street railroad management, and of opportunities to form friendly acquaintance between gentlemen of the same line of pursuit, which is desirable not only for the pleasure and recreation it affords, but for results of great practical importance in the conduct of business and ultimately to the public at large.

The formation of the Association, now entered upon its second year of hopeful life, elicited in these pages expressions of approval and cordial good-will, which initiated relations of a pleasant character between the JOURNAL and prominent street railroad men, and thus led to the enlargement of that department in our columns which is appropriated to matters coming directly within the scope of their interests. Antecedently to the birth of this organization, whose first annual convention is now numbered among the most interesting chapters of national progress, the editorial management of the AMERICAN RAILROAD JOURNAL had begun a policy entirely new in this country; namely, presenting side by side with information on the general railway system of the United States and Canada, and in its proper place as a distinct and exclusive department, such current news and comment on matters pertaining to street railroads, as diligence and enterprise could collect. The experiment thus early made was, as we have suggested, encouraged by the formation of the American Street Railroad Association; and its value and interest have so happily increased with time, that a very considerable and enlarging space in every succeeding issue of this periodical has been occupied with what our British cousins call "tramway" intelligence. In short, the department has grown with the Association, and the very encouraging outlook of the one means to us the certain expansion of the other.

This timely statement of an obligation to continually improve the street-railroad department, leads naturally to the acknowledgment of many encouraging words concerning it addressed to us by letter and otherwise, accompanied in some cases by expressions of approval taking the more substantial form of news, subscriptions and advertisements for insertion. In these ways, the experiment of a street railroad department, undertaken when such a feature of journalism was unknown, has developed into an "institution" of liberal dimensions and strength, and able to both promise and perform. At the same time this paragraph would be incomplete did we hesitate to invite the attention of street railroad companies and their responsible officers, to the great value of the JOURNAL to them, for its news, its letters, its accounts of inventions, its advertisements, and, possibly, its editorial opinion. It is largely devoted to their interests, and the reasonable expectation of their coöperation with us in the enlarging and strengthening of the street railroad department of the AMERICAN RAILROAD JOURNAL, is surely one which cannot be disappointed.

A PROMINENT officer of a street railroad in St. Louis writes to us of the AMERICAN RAILROAD JOURNAL, thus encouragingly: "All street railway companies should subscribe for such a journal for their own good; and it is a sleepy manager who fails to see where he can invest three dollars more profitably. Why your suggestion on rail joints and chair plates alone, in a previous issue, demonstrates the fact that you are alive to their interests." Of course we are, and better evidence of this fact is to be found in the present than in any past issue. Our arrangements for the future include a still more considerable augmentation of the strength of this department. The coöperation of the street-car companies, not yet so general as it will become, is respectfully acknowledged.

THE old discouraging conundrum, "Who will watch the watchman?" is clothed with fresh significance by a circumstance which happened in Brooklyn, recently. A conductor on one of the cars was arrested for crooked practices, and upon his person were found *two* of those metallic guardians of the conscience known as the bell-punch. It seems that this ingenious if not ingenuous gentleman was accustomed to ring first one of the punches and then the other—that being his idea of a fair divide. The result of course was that the punch which he reserved for the examination of the company called for only half as many fares as he had received. It remains for some gifted inventor to invent something that will prevent the duplication of the bell punch.

The Cable-Car System.

PROFESSOR E. T. COX read a paper on this system before the meeting of the American Association for the Advancement of Science, held recently at Minneapolis. His paper concludes in the following words, which remind us once more that "doctors differ."

"Mr. Moody Merrill, chairman of the Horse Railroad Convention held at Boston last March, says: 'There are in the United States and Canada, 415 street railways, giving employment to about 85,000 men; 18,000 cars and 100,000 horses in daily use. These horses consume 150,000 tons of hay and 111,000,000 bushels of grain. Their 3,000 miles of track represents an invested capital of $150,000,000. The number of passengers carried is 1,212,460,000 annually.'

"In the city of New York there are 110 miles of horse railway, and 11,866 horses are used to operate them. The horses, together with their harness, expensive lands and stables, feed and grooms, make the operating expenses $5,104,596.79 per annum. The average life of the street car horse in New York is less than three years. This terrible abuse of animal life should enlist the public sympathy, and commend at once a system which dispenses with the use of horses where they are so fearfully overworked.

"The present horse railways may readily be adapted to the cable system without serious interference with their travel. It simply requires the making of a trench in the center of the road, in which to place a tube through which the cable is to run.

"That eminent authority on economies in railroad passenger and freight traffic, S. F. Pierson, who is the assistant pool commissioner of the trunk lines from the Atlantic seaboard to the West, shows from official tables that the horse railroads of New York City, which have cost, including equipment and real estate, a trifle less than $23,000,000, carried in the year 1881 154,000,000 passengers, at a cost of 3 61-100 cents for each passenger, while if the cable system had been employed instead of horse cars, the cost of carrying each passenger would have been but 1 46-100 cents for each passenger; a saving of 2 15-100 cents per passenger, or $3,317,000 yearly, a sum equal to the interest at 6 per cent. on $56,000,000. Calculated on the same basis, the saving in Brooklyn would represent a capital of over $30,000,000. A saving of two cents per passenger carried on all the horse cars of the United States and Canada would amount to $24,249,200 yearly, a sum equal to the interest at 6 per cent. on $400,000,000.

"Gen. W. Sewell, United States Senator, of New Jersey, a practical railroad engineer, and of the management of the Pennsylvania Railroad Company, who has personally investigated the cable system, both in San Francisco and Chicago, says 'that within ten years the cable system will supersede the horse cars on every considerable street railway line.'

"The cost of constructing a cable car railway double-track line is between $70,000 and $80,000 per mile; but it is shown that the great economy of the system over the horse cars most fully compensates for this increase.

"Mr. Hallidie (who introduced the system in San Francisco) has disposed of his patents for England, and the system will soon be in extended operation on the other side of the Atlantic. The patents for the United States have been purchased by a syndicate in New York City, and they are preparing to have the cable roads introduced into all the principal cities and towns throughout the country."

The Philadelphia Cable Road.

THE friendly criticism subjoined is accompanied with valuable information. We accordingly print it with pleasure:

ROOM NO. 4, NEVADA BLOCK,
SAN FRANCISCO, SEPTEMBER 7, 1883.

Editor American Railroad Journal, No. 245 Broadway, N. Y.

DEAR SIR:—In your journal of August 1 appears an article entitled "The Street Railroad Problem," referring with more than ordinary intelligence to the various experiments heretofore tried for the purpose of propelling street cars without the use of horses. I desire, however, to call your attention to one error of some importance to the general public.

After referring to the cable roads in San Francisco and Chicago, you speak of the Brooklyn Bridge cable railroad, and then you say: "Why said experiment is a solitary one east of Chicago is something we wish to know," etc.

The facts are that the Union Pass. Railroad Company, of Philadelphia, have constructed a cable road on Columbia Avenue in that city, and have been successfully operating the same since the first day of April of this year, carrying from 15 to 25,000 passengers daily. This cable is a little over 10,000 feet in length, runs out of Columbia Avenue to the Park, where it makes a complete curve between the curbstones of the street, and returns. The car is carried clear round without releasing the grip from the cable, or inconvenience to the passengers in the slightest degree, a fact not before attained by any cable car. The cars are run without the cumbersome and expensive dummy in use by the old system in San Francisco and Chicago, the grip attachment being under the ordinary street car, and operated by the grip-man who stands on the front platform, an arrangement superior to any in use west of Philadelphia, very much cheaper and more simple to operate. An evidence of this is the fact that during five months of constant use with crowded cars not a single accident has occurred either to passenger, spectator or employé, or anybody or thing. It is perhaps due to this fact, in a measure, that you were not aware of there being any such road, as all other cable roads have obtained a notoriety for the killing and maiming of several monthly. The Philadelphia cable road is operated under the system patented by myself, and known as the Philadelphia system. Very respectfully yours,

JOEL B. LOW.

An Old Car Grip.'

PUBLIC interest in cable traction on the Brooklyn Bridge is maintained by the vexatious delays and disappointments attending the experiment there. Apropos of this matter, "Civil Engineer" writes to the New York *Times* as follows: "I think Colonel Paine would be saving a great deal of money and more valuable time, if he were simply to adopt the plan of grip that was used for years with every success on the Blackwall Railway in London, England, before the introduction of the modern locomotive. This line of railway ran from Fenchurch street Station, London, to Blackwall, a distance of some miles, and was entirely operated by a traction rope which was gripped and let loose as the stations (of which there were several) were approached or left. There were always many cars at intervals on both the up and down tracks, and the line was operated precisely as the line of railway on the Brooklyn Bridge, by a stationary engine at either end. I have traveled dozens of times by this railway, and on no occasion was there the slightest hitch or delay; consequently I feel justified in recommending the adoption of the grip there in use. The last time I traveled with the 'traction' on said line was in 1847—thirty-six years ago—in which year, I think, the more powerful modern locomotive was substituted for the traction rope."

First Annual Convention of the American Street Railway Association.

THE first Annual Convention of the American Street Railway Association was opened at Chicago on the ninth of October, 1883. It proved to be a highly interesting occasion, and the Association begins its second year with a membership of about sixty.

Mr. H. H. Littell, general manager of the Louisville City Railway Company, of Louisville, Ky., President of the Association, was present, also the following official members: First Vice-President, W. H. Hazzard, President Brooklyn City Railroad Company; second Vice-President, C. A. Richards, President Metropolitan Railway Company, Boston; third Vice-President, G. B. Kerper, President Mt. Adams and Eden Park Inclined Railroad Company, Cincinnati; Secretary and Treasurer, W. J. Richardson, Secretary Atlantic Avenue Railroad Company, Brooklyn. There were also present the following members of the Association:

Thomas Lowry, President, Jacob Sharp, Vice-President, C. C. Goodrich, Secretary Taunton St. Ry. Co., Taunton, Mass; Moody Merrill, President, Julius E. Rugg, Superintendent Highland St. Ry. Co., Boston, Mass.; Amos F. Breed, President Lynn & Boston R. R Co., Boston, Mass.; H. R. Harding, Secretary Metropolitan R. R. Co., Boston, Mass.; William H. Hazzard, President Brooklyn City R. R. Co., Brooklyn, N. Y.; William A. Morrison, Superintendent Bushwick R. R. Co., Brooklyn, N. Y.; Walter A. Jones, Vice-President New Williamsburg & Flatbush Ry. Co., Brooklyn, N. Y.; Samuel S. Spaulding, President Buffalo, East Side St. Ry. Co., Buffalo, N. Y.; Jacob Rehm, Vice-President North Chicago City Ry. Co., Chicago, Ill.; Henry M. Watson, President Buffalo St. Ry. Co., Buffalo, N. Y.; Charles Hathaway President Superior St. Ry. Co., Cleveland, O.; John H. Bonn, President North Hudson R. R. Co., Hoboken, New Jersey; Thomas Lowry, President, H. M. Littell, Superintendent Minneapolis St. R. R. Co., Minneapolis, Minn.; C. C. Woodworth, Secretary Rochester City & Brighton Ry. Co., Rochester, N. Y.; L. Brayton, President, D. F. Longstreet, Treasurer Union R. R. Co., Providence, R. I.; Charles Cleminshaw, Vice-President Troy & Lansingburgh R. R. Co., Troy, N. Y.; J. R. Jones, President, James K. Lake, Superintendent Chicago W. Div. Ry. Co., Chicago, Ill.; John G. Holmes, President Citizens' P. R. Co., Pittsburgh, Pa.; D. F. Longstreet, Denver City Ry. Co., Denver, Col.

President Littell called the meeting to order, and introduced its business with a review of the history of the Association, concluding with an encouraging statement as to its future.

The gentlemen whose names are subjoined were admitted to membership:

C. B. Holmes, president and superintendent Chicago City Ry., Chicago; W. Elson, superintendent Cedar Rapids & Marion St. Ry., Cedar Rapids, Ia.; W. W. Ward, superintendent and assistant treasurer New Haven & West Haven Horse R. R. Co., New Haven, Conn.; C. S. Goodrich, president Hartford & Weathersfield Horse Ry. Co., Hartford, Conn.; D. W. Stroud, president and manager Citizens' St. R. R. Co., Springfield, O.; F. G. Fish, president, C. Hathaway, vice president and manager Belle City St. Ry. Co., Racine, Wis.; Wm. C. Lange, manager, A. F. Mason, superintendent South St. Louis Ry. Co.; James H. Anderson, president, R. J. Anderson, secretary Keokuk St. Ry. Co., Keokuk, Ia.; T. J. Minary, vice president Central Pas. Ry. Co., Louisville, Ky.; P. C. Maffitt, president Missouri R. R. Co., St. Louis, Mo.; John H. Maxan, president Lindell Ry. Co., St. Louis, Mo.; Charles Parsons, president, Robert McCulloch, secretary Benton-Bellefontaine, Ry. Co., St. Louis, Mo.; Charles J. Harrah, Jr., vice president, Wm. Hagensweiler, general manager Peoples' Pas. Ry. Co., Philadelphia, Pa.

Secretary Richardson's report, which was received with hearty pleasure and approval, reviewed the work done by the Association since its inception. It commended the system of reports by committees, congratulated the Association on its encouraging and enlarging membership, and the interest evinced in its operations by street railway men generally, gave an account of the steps the Secretary had adopted to procure information as to the taxation of street railways in the United States and Canada, and announced that fifty-five companies had forwarded to him copies of their rules and regulations. These, Mr. Richardson hoped, would be made to serve as the foundation of uniform arrangements on the part of companies connected with the Association, as far as practicable. The report was adopted, also that of the Executive Committee, and that of Mr. Richardson, the treasurer.

The Report on Track Construction was as follows:

REPORT ON TRACK CONSTRUCTION.

To the President and Members of the American Street Railway Association:

GENTLEMEN: In the construction of street railroads certain interests have to be considered, one of the most important of these being the legal rights of the public. It is unnecessary to detail what those rights are, as our law-makers have fully attended to that part of the business, and do not hesitate to remind us of the fact, if we violate any of the provisions of the law laid down by them.

Your committee do not propose to go into and discuss the different methods of constructing tracks, as they are fully aware of the fact that the gentlemen present are all well acquainted with the different styles, and it is for them to decide as to the amount they would invest in a track, the style and durability of same being dependent on the amount invested.

As the population of a locality increases, the necessity for a convenient mode of transit from place to place becomes apparent, and this want is best supplied by the construction of a street railroad, under such municipal restriction that the rights of all are protected.

Nothing tends to develop any particular locality so much as a well-conducted street railroad. Along the course of its track will at all times be heard the sound of the hammer, indicating the erection of new domiciles, the builders of the same being drawn hither by the superior inducements offered for speedy and cheap transit.

The street railroad may well be called "the poor man's carriage." Under judicious and economical management the rate of fare should be such that the burden will be light on the public, at the same time making the construction of a street railroad a paying institution, thus encouraging enterprise in that direction. And in order that this may be accomplished, the best method of construction should be adopted, varying in different localities according to the nature of the traffic, present and prospective, on the contemplated route. The construction of street railroads should be such that other modes of traveling should in no case be interfered with, bearing in mind the fact that the rights of others should be respected in the same ratio that the rights of a street railroad corporation are maintained. Hence it is necessary that the greatest attention should be given to the full and complete repair of a track, quoting the old adage, that "a stitch in time saves nine," so may many a dollar be saved to a street railroad corporation by close watchfulness of a road-bed. A poor track and imperfect road-bed means decreased travel by that route, and loss to the company.

The public are tenacious where their rights are concerned. The jumping of a track by a car, and the consequent jolting occasioned thereby, tend to disgust shaken and demoralized travelers, and, with anathemas heaped on the head of the railroad corporation, they leap from the car and wend their way to business by their own private conveyance, namely, their legs. Hence the necessity of having good and solid road-beds, with rails equidistant from each other the whole length of the track. Further, the rails should be so laid that the least possible elevation above the road-bed and the road on each side of the track should exist. At the same time, great care should be taken that the paving should not be elevated above the rails, and that the cross-walks should be kept well down, for the reason that an elevated pavement or cross-walk causes the mud and ice to accumulate in the track, and prevents the proper use of the snow-plow in winter in keeping the track clear of snow. Should there be a great elevation of the rails, the railroad corporation is interfering with the rights of others by obstructing travel, and in some cases may have damages to pay by the breaking down and destroying of other people's vehicles. This is invariably the undesirable termination of neglect and carelessness in construction.

Every railroad operator has his own peculiar ideas as to the best methods of constructing a street railroad; and it seems to be a law of nature that every man should be wedded intimately to his own peculiar views, and sometimes with the fallacy of his views staring him in the face, he still blunders on,

> "For a man convinced against his will
> Is of the same opinion still,"

and in giving our views as to the construction of a street railroad, in the face of so many who have had as extended an experience as ourselves, we do not wish to appear egotistical. There are many points which have to be considered. And a very important one that must be well weighed, is the nature and extent of the travel along the route through which the road is to be constructed. If the travel is great it shows the necessity of a solid and well ballasted road-bed—a road-bed that will stand the crushing and

pressure from the forces applied on the outside of the track, and from between the tracks by the constant tramp, tramp of the horses in the drawing of the loaded cars. We should, therefore, recommend, for a good and well ballasted road-bed, good gravel, gravel that will bind; and if this cannot be procured, sand, or any other ballasting material that will cause the least rot to the timbers by allowing the water to filter through. The paving well and properly laid on this bed cannot fail to give satisfaction. When the traffic is very heavy, we should recommend heavy tram rail, from 40 to 45 pounds to the yard, and well spiked to stringers with good cast or wrought iron joint plates at the end of the rails.

We do not think we have advanced very much in the construction of street railroads. There is still room for great improvement. And one of the causes of this lack of advancement arises from the fact that the promoters of new lines desire it done as cheaply as possible, and, in the long run, with little satisfaction to themselves. A cheap street railroad may work well and give satisfaction where the travel is light, as in suburban towns, where a much lighter rail can be used, and paving in some places dispensed with.

We would recommend, for the laying of a good and substantial track, heavy timbers and heavy rails, and for the paving between the tracks, granite, medium stone, or cobble stones; on the tow-path between the tracks we would recommend paving with small cobble stones. We look upon this class of paving as the most durable and economical. In case of repairs to a street, or the tearing up of a street for the laying of sewers, or for any other purpose, the paving is easily put in a proper condition. This class of paving between rails is used in Pittsburgh, Philadelphia, Cleveland, Detroit, Chicago and other places where the cost of transportation is such that it will warrant use of same. It is found by experience that on tow-paths it is better for horses to travel on than any other road-bed that has hitherto been adopted.

We would recommend for suburban towns the construction of narrow gauge roads, and feel confident that they would give greater satisfaction. The width of a narrow gauge road being 3 feet, 3½ feet and 4 feet, prevents other vehicles from traveling on the track, thus preserving the road-bed and preventing it from being cut up. It has been found by experience that on a narrow gauge track a lighter car can be used. A car on a 3 feet gauge track requires 33 per cent. less power to pull it than does a car on the regular standard gauge track of 4 feet 8½ inches. This is a great advantage and economizes horse-flesh.

We would not recommend the T rails, except where they can be used on the sides of the street, where there is comparatively little travel. It is almost impossible to keep a track of this kind properly gauged up, and it is difficult to pave up to it, so that you cannot with its use have a perfect track and road-bed.

A word on car houses and tracks leading into car houses. Car houses should be so arranged as to save all possible room. We should recommend that at the curve from the street to the car house a turn-table should be placed, and two tracks leading therefrom to the house we think advisable. The benefits of a turn-table can be readily seen. In case of fire cars can be handled and got out of the house much easier and with much less help than by pushing them out round a curve to the main track.

Transfer tables in car houses we find almost indispensable. The convenience of this method of transferring cars from one track to another is unsurpassed. The "Improved Transfer Table" we find by experience to be the best. It is easily placed in position and requires no pit to be made, and forms one continuous line of track. By its use all room is utilized without losing space by the laying of cross tracks.

We would urge on street railroad corporations the great necessity of keeping the tracks in good repair and properly gauged up. We notice that very little attention is paid to this matter after the track is once made. This is a great mistake, and of a costly nature.

The joints should be kept well up, thus preventing pounding. If this is not well attended to, the ends of the rails will in a comparatively short time become laminated.

The foregoing we offer as our report on construction. If there are any hints thrown out that may be thought worthy of consideration, we shall think ourselves well repaid.

Respectfully submitted,

CHARLES HATHAWAY.

An interesting discussion followed the reading of this report, in which speeches were made by Mr. Wm. H. Hazzard, Mr. Augustus W. Wright, Mr. Charles Cleminshaw, Mr. L. Brayton, Mr. Kreisiman, Consul-General in Berlin, Prussia, Mr. Moxon, Mr. Maxan, Mr. Wm. Wharton, Jr., Mr. Mulvane, Mr. Henry A. Watson, Mr. Hathaway, Chairman of the Reporting Committee, and other gentlemen. The committee's views were regarded favorably excepting that passage of the report claiming a saving of thirty-three per cent. by the use of the narrow gauge.

The report was adopted, after which the convention adjourned until the evening of the same day.

Business was resumed by the reading of the Report of the Committee on Building, which, taking into account that thirty per cent. of the cost of street railroad operations is in the purchase and care of horses, urged the importance of providing the most sanitary mode of stabling, and named the buildings of the North Chicago City Railway as models of construction.

The adoption of this report was followed by the reading and adoption of one submitted by the committee on Labor and Wages, which recommended the payment of liberal salaries to secure intelligent employés, increased remuneration to employés of long standing and the provision of houses for the men to be paid for on the installment plan.

Mr. Robert Bell, Superintendent of the Detroit City Railway, read a report on snow and ice, which gave a valuable account of the practice in Detroit. In that city plows and scrapers are employed in the removal of snow, preferably to salt, which is found to be too expensive and is used in small quantities.

The subsequent discussion was shared in by Mr. Harding, Mr. James K. Lake, Mr. Threedy, Mr. Wm. H. Hazzard, Mr. Wm. Wharton, Mr. Wm. J. Richardson, Mr. J. E. Rugg and Mr. Charles Hathaway, representing the cities of their respective residence, as given above in the lists of gentlemen present. The prevailing opinion was favorable to the use of salt.

A report on horse shoeing, read by Secretary Richardson, recommended the flat shoe, thus providing for the moistening of the frog of the foot of the horse by its contact with the pavement. Speakers were divided in opinion as to whether or not calks should be used.

The convention accepted an invitation from Mr. C. B. Holmes, President and Superintendent of the Chicago City Railway Company, to inspect its cable system; one from Mr. Gregier, city engineer, to visit the Chicago water works, and an invitation to a banquet tendered by the Chicago street railway companies. This ended the business of the first day.

On the following morning, (that of the tenth of October,) the convention reassembled at the Grand Pacific Hotel. A lively discussion on heating street cars evidenced a strong dislike to it on the part of the speakers. We subjoin the valuable report on motive power:

REPORT ON MOTIVE POWER.

Your committee on motive power would respectfully submit the following report:

The subject of propelling street cars is by no means a new field of thought, but one to which many minds have lent their most earnest endeavors, in the hope of securing some means of dispensing with the use of animal power, that being the original and most common way of to-day.

In discussing the problem of the different motive powers proposed or adapted to accomplish this end, we have for convenience divided the various systems into three classes, as follows:

1. Locomotive power applied to surface roads.
2. Elevated railroads.
3. Cable railroads.

In the brief time allowed us for the reading of this paper, we will not be able to undertake, as fully as we would like, to give the details of construction and comparative costs of the various classes of motors. And, indeed, to do so would be very difficult, as the local influences are so varied that the question of cost to meet one case would be totally different in the next. We shall have to content ourselves, therefore, with the discussion of the general principles involved in each, leaving the details for further consideration.

Before going into the subject of the different devices suggested for dis-

pensing with animal power, we had better look at some of its defects, or at least the difficulties encountered.

Animal power is divided into two classes, the horse and the mule. We find in discussing the advantages of one over the other with street railroad men, there is a wide difference of opinion on the subject, but by looking at it from an impartial standpoint, we believe that there are certain circumstances under which horses are preferable, and others in which mules can be used to the best advantage, the difference of opinion generally being as to where the line should be drawn. In point of appearance horses are the most desirable, and where the traffic is very heavy, immense loads being hauled, horses having the most weight, are better able to accomplish the work. This is also true when snow storms are encountered, as the draught is very materially increased under such circumstances. On the other hand, it is claimed that horses are much more susceptible to both blemish and disease; that the percentage of disabled horses in a given number will be three or four times that of mules. In New Orleans, for instance, where snow storms are rare, with no grades, where for a large portion of the year an excessive heat prevails, mules beyond any question are the best. As you go north, and encounter grades and severe winters, their advantage decreases, until finally you find all the advantage on the other side, horses being preferred in such cases.

By actual experiment it has been found that the expense of feeding and caring for the horse is very much more than for the mule.

One of the difficulties encountered in the use of mules is the tendency in large mules (of sufficient weight to compare favorably with horses) to being very slow. Mules that are said to be best adapted for use on street railroads are the medium sized ones, in which class, it is claimed, are the largest number of free drivers, which is very necessary to their successful use.

In connection with the subject of animal power, we feel that a word should be said on the subject of car-starters, since the aim in the minds of many inventors who have spent much time and money in both trying to perfect, and, we may say, in perfecting, a mechanical device that will utilize the momentum of the car lost in stopping to be applied in the direction of starting the car.

This thought grows out of the fact that the great majority of people believe, and, indeed, it is a very common expression heard on board street cars, that the wear and tear of the animal is in making the start, and that when a car is in motion it requires little or no exertion on the part of the team to keep up the speed. This to a casual observer would appear to be the case. For instance, when you see the animals straining and tugging to start an immense load of passengers, and when started notice at once the comparative ease with which they draw the same, such a conclusion seems to be the right one.

The fallacy of this is easily proven, however, when the subject is thoroughly investigated.

Regarding the durability of machinery, whether it be a cutting-box or a steam engine, we should examine it when it is worn out or, at least, as it approaches its end of usefulness, to find out and strengthen its weakest parts. Why not apply this rule in examining the worn-out horse (our machine)? We look in doing so for the weak points first, those points which are most susceptible to wear and tear, and we find them where? In the legs, of course. We have heard horsemen say, as we believe truly, that one body will wear out ten pairs of legs in street car service.

Worn-out street-car horses, as a rule, have all their parts intact at the time they are abandoned for service, except their legs. We should go a little further, and confine it to the lower part of the legs, where we find the delicate muscles and sinews that form the ankle and knee-joints. These appear battered and bruised, the adjoining bone unhealthy, the hoof diseased, but otherwise an able-bodied, well animal. If it were in our power to do with it, as we do with worn-out machinery, replace the worn-out parts, there would be no necessity for dispensing with animal power, as, this evil remedied, our rejuvenated machine (the horse) would be a most durable one (if the price of legs were not too high). This much being allowed, examine the horse in the act of starting a load, to find out which of the leg muscles or joints are most actively brought into service. Are they the muscles from the knee down? Are they those delicate joints? Or are they the heavy muscles of the thigh—those muscles that in a worn-out horse are so perfect? We think the latter, for the reason that a disabled street car horse, with the joints misshapen and lower muscles partially disabled, is still an animal capable of pulling an immense load slowly, going to show that its ability to start heavy weights is still perfect, the difficulty being in its power of rapid locomotion. In proof of which, horses that cannot travel fast enough to be of service will pull the heaviest load with perfect ease, indicating that the other pulling muscles are intact and good to the end. You have observed, perhaps, to what good use worn-out car horses can be put on farm work, ploughing, or the heaviest sort of hauling. The greatest draught horses are very often from the worn-out street car horses, where no speed is required, but great strength. A horse will pull a plow or a heavily loaded wagon nine or ten miles a day, in which there is a steady pull every inch of the way; and yet 10 or 15 miles travel on a street railroad is all we can reasonably hope to get as a day's work. If our data are true then, that in a worn-out horse we find those muscles in a perfect state that are brought into action in starting a load, and the defective muscles and joints, those that facilitate him in speedy travel, it would also follow as a logical conclusion that the great strain and tugging in the starting of a load is not nearly so injurious as that hammer, hammer, hammer, on the delicate parts of the lower muscles and joints when a horse is traveling, and apparently doing no work at all.

To state the proposition in a different way, it is the miles traveled and not the load pulled (within certain limits, of course,) that destroys and makes our horses unfit for use. If then, as we say, the argument is a false one that the "great object to be attained to save horse-flesh" is to avoid the strain at starting, we at once have taken away from under the car-starter theory all the ground it had to stand on, and if it were possible to make a machine so simple and durable in all its parts that there could be no complaint on the score of economy, even then, in our judgment, a car-starter is a failure. It is an attempt, we believe, to protect the strongest part of a machine instead of the weakest, and as the measure of strength is always that of the weakest, we have gained nothing.

We will next look a little into the subject of locomotive power as applied to surface roads.

Now we are in a wide field. We have first the ordinary steam locomotive, built with a view of being useful in the public streets—we will say noiseless, smokeless and beautiful to the eye. Then we have the fireless locomotive, receiving its charge of steam at the end of the route from stationary boilers. We have also the pneumatic engine, very closely allied to the fireless engine, the difference being in a charge of compressed air in one case and a charge of steam in the other. Electric engines are also in use, receiving their power from an electric current generated by a stationary steam engine, and transmitted to the car by utilizing the rails of the track to form a part of the circuit.

We have heard suggested, though never tried to our knowledge, the application of a gas engine, that utilized the explosive power of gas as a motor. All of this class of motors rely entirely upon applying motive power so as to rotate the wheels of the car or motor, obtaining their locomotion from the friction between the wheels and the rail. In this they resemble steam railroads, but encounter difficulties that steam railroads know nothing about, our curves being of necessity of a very much shorter radius, and grades in the highway being fixed by the laws of chance, or bad engineering. Even in cases where we are fortunate enough to have a straight and level road, we still have the grit and dirt to contend with that is necessarily present in all thoroughfares. Our track being forced on a level with the surrounding road-bed and not elevated above it as our neighbors'; add to this the snow and ice difficulty, and you have a complete picture. For instance, a number of able-bodied passengers assisting to start a car, with the usual kind words for the management heard on such occasions.

It may be said, in answer to this, that New Orleans has had in successful operation for years steam locomotives applied to their street railroad system. While this is true, the limited way in which it has been used, never having grown at all in its many years of service, proves that even there, under the most favorable circumstances, it has not been very successful. New Orleans uses locomotives on a straight street, without a grade or curve, the track being located in that part of the street not given to the travel of other vehicles, and what is known as "neutral ground," or lawn, situated in the center of the street on which the street railroad track is laid. They only have street grades to encounter at the intersections of cross-streets.

They first adopted on this road what was known as the fireless system of steam engines, getting their heat and pressure from a stationary battery of boilers at one end of the line, obtaining from that sufficient steam to make at least one trip. They have since changed this by adding the fire-box to the locomotive, so as to generate its own steam.

Only under the most favorable circumstances have they been able to keep the road in successful operation with the steam motor. They have never ventured to use it in the busy part of the city.

For ordinary street car service this system presents no advantages, to our mind, over what we have.

The same argument applies with equal force to the use of all motors of this class, viz.: The inability to secure friction sufficient to propel crowded cars under difficulties, unless invention devises some means of increasing the traction of the motor beyond the weight of its load. Cog-wheels would do it, but it is absurd to think of such a thing in practical use.

We claim, in conclusion, in speaking of this class of motors, that they have an insurmountable barrier to overcome, so long as they rely upon merely rotating the wheel to apply the power. In this of course, we are taking for granted the fact that they can produce a machine of sufficient durability and simplicity to be easily controlled by the class of men employed ordinarily on street railroads.

As to elevated railroads, they are, strictly speaking, not one of our class. We are bound, however, to recognize this fact: That there is a point beyond the abilities of our ordinary system of surface roads to do the work required, and when this point is reached, the elevated road becomes a necessity, especially when a great number of passengers over a given line are to be carried a long distance, in which the time occupied in making the trip the ordinary way is too lengthy, condemning, as it does, a vast com-

munity to an imprisonment in a street car of several hours a day, which in the course of a year amounts to many days. For instance, a passenger having seven or eight miles to travel daily from his home to his place of business and return, will on an average consume three hours a day in a car, though he only makes the trip morning and night. This for a year amounts to about 30 days' car riding. The idea of being confined to 30 days' imprisonment in a street car, even to the most ardent admirer of our profession, is not an agreeable thought.

The great expense and cumbersome appearance on the street will, of course, retard their growth until to build them becomes a necessity. In our opinion, there are but few, if any, opportunities for the successful building of elevated railroads in addition to those already constructed.

We now come to the cable system of railroads. This is a system which utilizes the power of a stationary engine, to operate cars at will, miles away from the source of power, transmitting the power by the medium of an endless cable to the point required, and at the necessary time. This system, in our judgment, (though in its infancy now) is on the right road to solve the problem of dispensing with animal power, a system instead of a disadvantage, and less serviceable on heavy grades and in the midst of snow storms, furnishes at such times a superabundance of both speed and ability to resist obstacles—a system that does not depend upon the friction between the wheels and the rail for its power of locomotion; a system that enables street railroads to handle immense crowds by the simple addition of a few more bushels of coal and the putting on of extra cars, without the fear of overloading its animals, and killing more in one day than its profits would be in a month; giving us, in other words, more latitude in the way of economizing in dull times (without having horses to feed, whether they work or not), and furnishing ample means of expansion on short notice, without the necessity of hiring extra animals for such occasions.

Do not mistake our eulogy of this system by believing that we are blind to its faults, as it is of its faults that we desire most fully to be heard, hoping that in the discussion of the difficulties in its way, we may encourage the already stupendous efforts in the direction of curing them. We realize that there are many with ample means laboring for the attainment of this very end. Their success, to our mind, is but a question of time.

The cable road, as it is to-day, is only available under the most favorable circumstances. First, it requires a magnificent business, for the reason that the outlay is so great that an enormous sum is eaten up in paying interest on the cost of construction. It requires a comparatively straight road, for the reason that as yet the turning of curves in an economical and simple manner has not been accomplished to our knowledge. There are a number of minor defects, which are always found in new machinery. These can only be remedied by time and experience. But minor troubles should not discourage us in the least, our main objection being to the two points above stated. The first, the heavy outlay involved, is not so serious a matter, as we see indications of a simpler and more economical construction being developed. Add to this the very low price steel has reached, with the tendency still downward, we are of the opinion that the cost of the road-bed construction will, in a short time, be greatly reduced. As to the difficulty they have in accomplishing curves, we are quite sure that invention will devise some means of curing the evil. The system as it is now has, as its worst objection, the great expense in the maintenance of auxiliary cables. But with all its defects it gives us great hope.

We believe, in conclusion, that the only practical means presented to our view for dispensing with animal power is the cable system. At present the cable road is confined to a few favorable localities, but rapid strides are being made in the direction of its perfection, which will surely result in bringing its motive power within the reach of roads less favorably located.

Concluding, we will add, beware of car-starters, and lend a helping hand to those trying to perfect that system which is at present our only hope for dispensing with the annoyance and expense of animal power.

Mr. C. B. Holmes, superintendent of the Chicago City Railway Company, responding to an invitation to address the convention, stated that the company now operates twenty and a half miles of cable. While it costs twenty cents a mile to run cars with horses the cable system run them for ten. Blocks made of Babbitt metal had been found preferable to wooden blocks in the clutch to grip the cable. The company's cable had cost twenty-five cents a foot, and the entire cost per mile of road had been $105,000. The total expenditure for the cable roads had been two and a quarter million dollars.

A discussion, following the report of the committee reporting on the collection of fares, seemed to show that the feeling of the convention was in favor of using means to prevent fraud and carelessness on the part of conductors, while report favored the bell-punch as generally, if not in all cases, preferable to the stationary register; the opinion of several speakers was strongly in favor of the latter, bell-punches being easily counterfeitable.

An amendment, proposed by the Executive Committee, changing the date of the annual meeting from the second Tuesday in October to the third Wednesday of the same month, was carried.

At the adjourned and final meeting of the convention, held on the evening of the tenth of October, the following official appointments were made: President, William H. Hazzard, president City Railway Company, Brooklyn, N. Y.; first vice president, James K. Lake, superintendent Chicago West Division Railway Company, Chicago, Ill.; second vice president, George B. Kerper, president of the Mt. Adams & Eden Park Inclined Railway, Cincinnati, O.; third vice president, D. F. Longstreet, secretary and treasurer Union Railway Company, Providence, R. I.; secretary and treasurer, William J. Richardson, secretary Atlantic Avenue Railroad Company, Brooklyn, N. Y.; executive committee, H. H. Littell, Louisville, Ky.; John G. Holmes, Pittsburgh, Pa.; J. E. Rugg, Boston, Mass.; P. G. Maffett, St. Louis, Mo.; Jacob Sharp, New York, N. Y.

The next annual convention of the American Street Railway Association will be held in New York City.

List of Recent Patents for Inventions Relating to Tramways.

BEARING DATE SEPTEMBER 4, 1883.

284,160. PAD-TREE FOR HARNESS: Henry Gustav Albrecht and Christian Neilson, Wahpeton, Dak. Filed Dec. 19, 1882.

284,254. GUARD ATTACHMENT FOR CITY-RAILWAY CARS: John Stephenson, New York, N. Y. Filed April 25, 1883.

284,419. HARNESS-SADDLE: Michael C. Hayes, Boston, Mass. Filed June 28, 1883.

284,445. HEAD-NET FOR HORSES: Luther B. Lee and George W. Lee, Ridgewood, N. Y. Filed July 21, 1883.

284,563. CONTROLLING-STRAP FOR HARNESS: Geo. Kinnier, Jr., Baltimore, Md., assignor to Adelia Kinnier, same place. Filed June 18, 1883.

BEARING DATE SEPTEMBER 11, 1883.

284,658. HORSE-COLLAR PAD: William H. Osmer and Robert M. Grier, Bonfils Station, Mo. Filed June 25, 1883.

BEARING DATE SEPTEMBER 18, 1883.

285,012. HALTER: Juliaette W. B. Carpenter, Medford, Mass. Filed Aug. 6, 1883.

285,026. FLY-NET: Timothy Gingras, Buffalo, N. Y. Filed Aug. 6, 1883.

285,177. HARNESS-SADDLE: Jos. B. Sulgrove, Indianapolis, Ind., assignor to Mary L. Sulgrove, same place. Filed April 21, 1883.

285,215. HORSESHOE: George W. Bowen, Fort Wayne, Ind. Filed Jan. 9, 1883.

285,252. FEED-BAG: James W. Gedney, New York, N. Y. Filed Aug. 3, 1883.

285,261. HORSESHOE: Francis M. Hartman, Marathon, Ohio. Filed April 28, 1883.

285,268. ANIMAL-POKE: Stephen N. Howard, Eatonton, Ga. Filed Jan. 18, 1883.

285,353. PROPELLING CARS BY ELECTRICITY: Jos. R. Finney, Pittsburgh, assignor to himself and Thomas B. Kerr, Allegheny, Pa. Filed Feb. 15, 1882.

BEARING DATE SEPTEMBER 25, 1883.

285,379. HARNESS: John Beha, Louisville, Ky. Filed May 26, 1883.

285,428. HAME-FASTENER: Andrew Niccum, Topeka; Kans.; James R. Niccum, Administrator of said Niccum, deceased. Filed Jan. 15, 1880.

285,434. HARNESS-BUCKLE: Samuel S. Sargeant, Newark, N. J. Filed Aug. 16, 1883.
285,466. REIN-HOLDER: Abraham Cottrell, Lansing, Mich. Filed July 14, 1883.
285,468. REIN-HOLDER: J. Edward Daniels, Holbrook, Mass. Filed Jan. 4, 1883.
285,514. CABLE RAILWAY: Henry Root, San Francisco, Cal. Filed July 30, 1883
285,525. REIN-HOLDER: Judson L. Thomson, Sy5acuse, N. Y. Filed Oct. 26, 1883.
285,562. SOFT-GROUND HORSESHOE: Lyscom Brigham, Orangeville, Mills, Mich. Filed July 28, 1883.
285,717. BRIDLE-BIT: Oscar Wiener, Henry Coates and Simon Wiener, Newark, N. J. Filed Dec. 1, 1882.
285,742. FARE-BOX: T. Walter Fowler, Washington, D. C., assignor of one-half to Daniel W. Glassie, same place. Filed May 28, 1883.
285,746. STREET-PAVEMENT: Virgil A. Gates and Mordecai Levi, Charieston, W. Va. Filed July 21, 1883.

To the Editor American Railroad Journal.

SIR:—I have read with interest your article in the August number entitled, "The Street Railroad Problem," and having given somewhat of time and thought to the same subject, venture a few remarks.

I agree with you that some motor cheaper and better than horse-power, is most desirable; but the problem is beset by diffiulties and remains unsolved. The strongest advantage of the cable system is that it is independent of the adhesion of the driving-wheels upon the rail. Almost every other system, other than animal power, is dependent upon this fact. What is the result? Simply this: if the motor be made independent of the passenger car, a construction possessing many advantages, it must depend upon its own weight for adhesion. "By adhesion is meant the resistance which prevents or opposes the slipping of the driving-wheels on the rails, and is due to the friction of the former upon the latter; which, like all friction, depends upon the weight or pressure of the two surfaces in contact, and consequently upon the load which rests on each wheel, It also depends upon the condition of the rails, and probably to some extent upon the material of which they and the tires on the wheel are made. If the rails are quite dry and clean it will require a force equal to about one-fourth the weight on the wheels." (Catechism of the Locomotive).

Upon the rails in the streets in most of the cities of this country this adhesion would be greatly lessened. In the absence of direct experiment, I am not prepared to say positively how much, but should venture the opinion it would be reduced at least one-half by the greasy, slimy, unctuous mud, that in this city at least, covers the flat rail head nine-tenths of the time, when it is not washed by rain or snow. In proportioning a train to the locomotive's capacity, due regard is had to the condition of the rail, and if the latter become wet and slippery from dew, rain, etc., fewer cars are taken. Upon most street railroads, not more than one car would be permitted to be attached to the motor for obvious reasons regarding the safety of passengers and those upon the street, the danger of accident being increased. A motor must therefore be proportioned to make its maximum load at *all times*, and under the most favorable conditions of traction. It must be heavy enough to have a reserve of power, and adhesion to surmount the steepest grades and sharpest curves upon the road with its *greatest* load. It must be heavier in proportion than a locomotive for two reasons: First, because its adhesion is less, on the flat, muddy street rail. Second, because the resistance to progress on these rails is much greater. The usual allowance for this friction upon a straight and loose track of "T" rail is six pounds per ton to keep the car in motion after starting, an average of fifty-three measurements upon a new street rail track of this company gave twenty-nine and four-fifth pounds per ton—nearly five times as great! Recognizing these facts, Mr. Pole in his motor, "deriving fire from a gas, or other engine, operating upon a series of pumps or valves, sets in motion the movements of the motor. In the first place there are two fluid cylinders so arranged as to bring the pressure of the fluid upon a foot which goes down upon the cobble stones between the tracks, making a step of 3 ft. 2 inches in length; and every time this grip-like device, fitted with teeth and easily adjusted for receiving purchase or hold, makes a step, the motor is propelled or pushed forward 3 feet 2 inches, the step to be increased or decreased by regulation from the engineer. The foot is padded with rubber, which gives its stroke upon the earth such elasticity that there is no jar or sudden start." David Gordon, December 18th, 1824, proposed a similar machine in his English patent of that date, except that he used steam as a motor. It has not been heard of for these many years!

"There is nothing new under the sun." So far as I know, the chief cause of failure in most motors, has been this necessity of making them so very heavy (for the above described reasons) resulting in great wear and tear of track and its rapid depreciation, entailing greater expenditure in maintenance than the saving over horse-power. Compressed air as tried by this company years since was unsatisfactory, and the experiment abandoned. The above brief statement, Mr. Editor, is my reason for asserting the inferior advantages of horse-power up to this time, and I have seen the statement that the Paris tramways, after numerous experiments with divers motors, have returned to horse power. The practical working and financial survey of the cable system in this city does not appear to be such as to cause its immediate adoption elsewhere, and "puzzles the will and makes us rather bear those ills we have than fly to others, that we know not of."

Respectfully,

AUG. W. WRIGHT, Supt. Track & Cars,
September 21, 1883. with Chicago Central Ry.

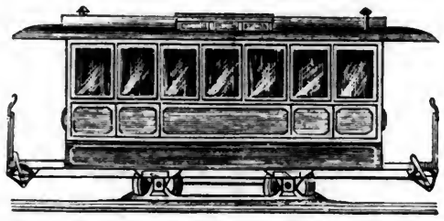
THE horse population of the United States is now over 11,000,000, or about one horse to every five humans. According to the 1880 census, the leading horse states, with number of horses respectively, were: Illinois, 1,023,082; Ohio, 736,478; New York, 710,358; Pennsylvania, 534,587; Michigan, 378,778; Kentucky, 372,648. Two-thirds are draught and all-work horses, and one-third are used for pleasure driving.

A MILLIONAIRE in Philadelphia who endorses the views of Mr. Charles Francis Adams, Jr., about the dead languages, says that he lives in the most convenient place in the city, for "the horse-cars run *pro* and *con* on his street."

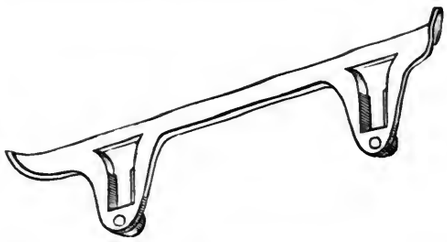
THE only international street railroad in the world is the one which connects El Paso, Texas, with Paso del Norte, Mexico, two and one-half miles long.

Street Car Fenders to Prevent Accidents.

THE fenders shown in the illustrations are intended to prevent street cars running over children, and to throw off



every stone from the track larger than one and a half inches in diameter, besides keeping the track clear enough of snow for the car to run readily. They are attached to the journal boxes instead of to the body of the car, run one and a half inches from the rail, are unaffected by the jolting

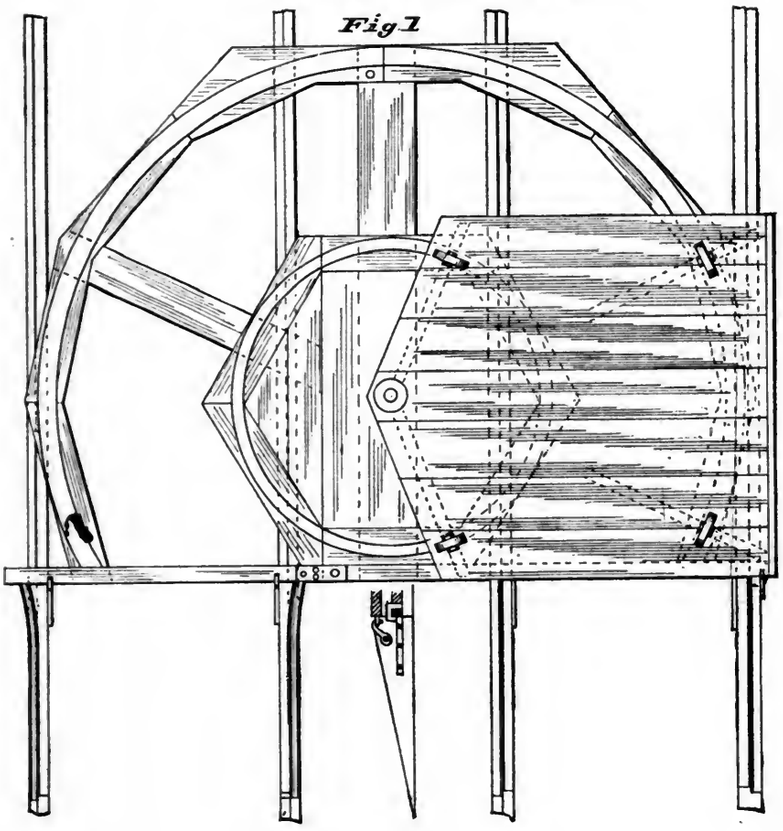


or action of the springs, pass along the sides of the wheels and curl around in front of them, and are provided with a lever by means of which they may be lifted out of the way if an obstruction is to be passed, or the track left for any reason. They are cheap and easily adjusted.

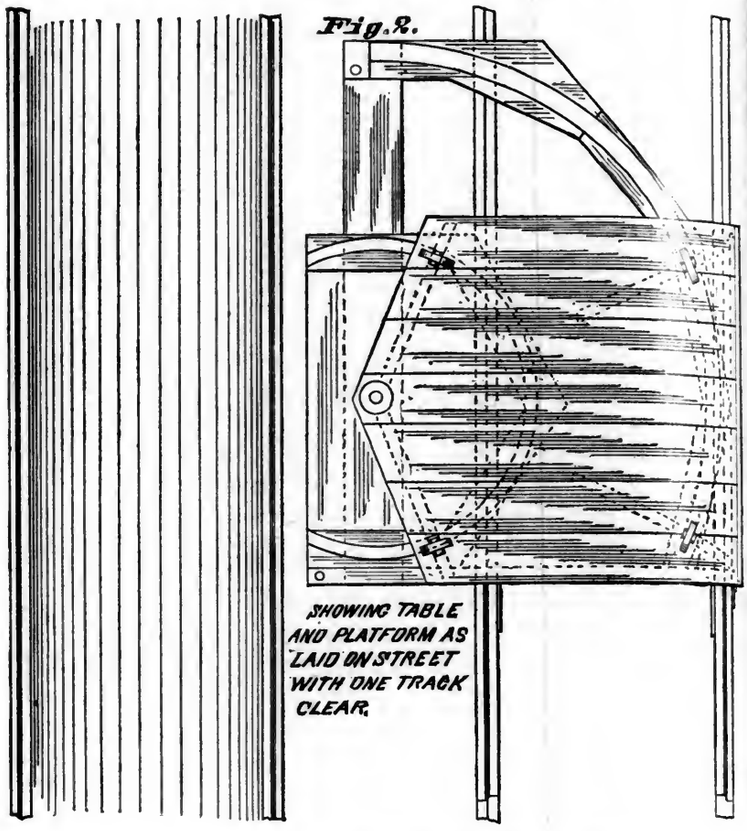
For further information apply to Theodore Hunt, No. 413 North 12th street, St. Louis, Mo.

Portable Turn-Table and Switch.

FOR STREET RAILWAY COMPANIES.



THE accompanying cuts represent a "Portable Turn-Table and Switch combined," especially adapted for use along the route in case of blockade to street cars, or for



temporary use at ends of line, while permanent tables are undergoing repairs. It is built in four sections, and is easily handled, and simple to lay and operate.

Its advantage as a portable table and switch is, that it can be thrown into a wagon and carried to any part of the road, and there laid in three minutes' time by any person of ordinary intelligence.

It costs less, delivered in any city in the Union, than the price at which an ordinary switch can be laid, and its advantage over the switch is that it can be laid at any point on the road, and the car can be turned around and transferred to opposite track in one-half minute's time.

Two of these tables have been used in St. Louis during the procession of the Veiled Prophets on Oct. 2d, 1883, one by the Union Railway Company, and one by the Lindell Street Railway Company. Both large and small cars were turned on them, and many of the cars had on board from twenty to thirty passengers, who remained in the cars and were turned with safety. Each of these tables cleared its entire cost in two hours' use, besides affording accommodation to a large number of the patrons of the roads.

It is the invention of Geo. W. Baumhoff, secretary of the Lindell Street Railway Co., of St. Louis.

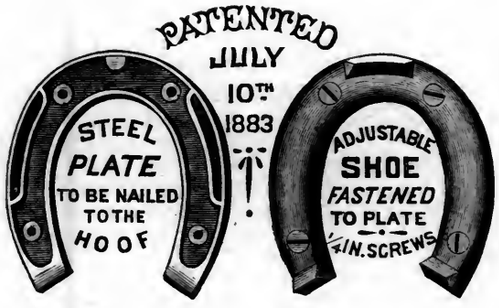
A Car-Starter.

A CAR-STARTER, the invention of Henry Clark, of Milwaukee, Wisconsin, deserves more than the local celebrity it has attained.

The principle on which it works is by what is technically termed the "knee movement" and "foot." The inven-

tion is placed directly under the fore portion of the car, being attached to the bottom of the car, and to a lock directly underneath the driver. When the driver desires to stop the car on an upward grade, he steps on a slight projection in his box, which opens a lock underneath and enables the cross-tree, to which the machine is attached by a sliding bar, to fall to the ground. The knee-motion has the effect of causing an iron foot to fall directly underneath the central portion of the car, which coming in contact with a projection in the road-bed, anchors the car firmly and prevents it from sliding back in the least. In case the brake should become unmanageable or out of order on a down grade, the car could be instantly stopped by opening the lock, which is done simply by a pressure of the foot, and a bar which is a continuation of the iron sliding bar in front, operates in the same manner as the foot under the center. When the car-driver desires to start up, the foot being on the ground, he merely gives the line to the team. The unopened lock allows the cross-tree to rest almost on the ground. As the horses move on, the motion has the effect of raising the cross-tree until it rises to the height of the lock, when it at once becomes fastened. In doing so, the knee-motion also raises the foot under the center of the car, and the impetus thus given by the resistance of the foot on the ground starts the car gradually and gently.

Helms Bros. & Company, corner of Washington and Barclay streets, Milwaukee, will be pleased to forward information to inquirers.



DR. A. C. HAWES, of Noroton, Conn., has secured Letters Patent, in the United States and Canada, for an improvement in "Horseshoes," especially adapted for winter use, or whenever the frequent sharpening of calks is required.

The improvement is in the "Duplex shoe," or thin plate and shoe combined. The plate and shoe, cast in steel or malleable iron, are paneled and ribbed, forming a *light strong shoe*, with hardened calks.

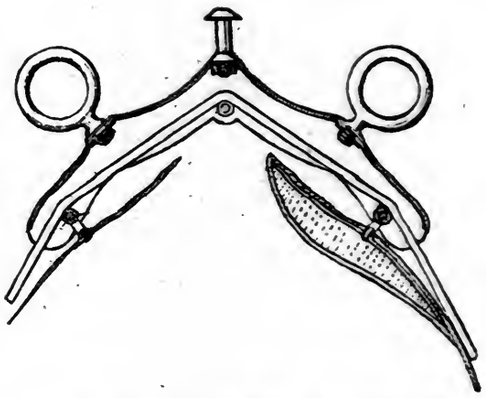
The plate, provided with suitable projections for keeping the shoe in place, is nailed to the hoof, in the usual manner. The shoe, (corresponding in number), is then secured to the plate with counter-sunk screws, or small square-headed bolts, as preferred, which hold the shoe as firmly in place as when nailed to the hoof. The shoe can be quickly removed, and a new or duplicate (sharp) shoe replaced, without delay, disturbance or *injury* to the *hoof*, and at less expense than the present method of sharpening calks. "Toe weights" can be adjusted in the same manner.

According to the universal testimony of writers upon the horse, frequent removal of the shoe causes a waste of material far exceeding the natural growth of the foot.

"As the value of the horse depends more upon the soundness and strength of the hoof, than any other qualification," and as this shoe obtains and preserves this condition, and saves valuable time, its importance can hardly be overestimated.

Gurney's Harness Saddle.

THE harness saddle invented by J. Theodore Gurney, of Boston, and patented by him, combines, as stated in the claim and readily made out in the illustration, the pad-plate, the tree having the downwardly-extended walls or



flanges, and having a tight wall or cover between said downwardly-extending walls or flanges, and the anti-friction rollers mounted in said tree and concealed beneath the wall; the combination, with the pad plates of the tree having anti-friction rollers mounted therein, the downwardly-extended flanges or supports for said rollers, and a cover or wall between the downwardly-extending flanges or roller supports, said parts being arranged to conceal the rollers and that portion of the back strap lying upon or in the tree; in a harness saddle, the combination of the tree, the pad plates pivoted or hinged thereto and arranged to rock relatively thereto when in use, and the anti-friction rollers mounted on the axes of the pad plate; in a harness saddle, the combination of the pad plates, the tree having anti-friction rollers for the back strap, a pivot extending from one side of the tree to the other for connecting the said pad plate to the tree, and which is situated out of the line of the back strap to avoid contact of the latter therewith; the combination of the tree having downwardly projecting supports or flanges, anti-friction rollers mounted in the tree for the back strap, the pad plates, the pivotal support on the tree for the pad plate, and the connecting devices carried by the pad plate and loosely attached to the pivot, and situated between the vertical flanges of the downwardly-extended supports or flanges.

The Dickinson Car Brake and Starter.

THIS brake and starter, Patent No. 283,219, is so constructed as to store up the force exerted by the momentum of the car while stopping, upon a spring coiled around the axle, which force is expended to start the car.

The construction is as follows: Each end of the spring fastened to a brake wheel, the whole moving freely upon the axle, to right or left. Each brake wheel has cast upon its outer face, ratchet teeth to engage with similar teeth

upon the inner face of the car wheel. Two brake shoes are so placed as to clamp the rim of the brake wheel firmly. The whole is built within a light frame which is connected, by means of a rocking shaft running the entire length of the car, with the shipping levers which stand upright at each end of the car. There are two other rocking shafts, also running the entire length of the car, one on either side of the shipping shaft, which are connected with a knuckle jointed lever, the office of which is to clamp and unclamp the brake shoes upon the brake wheels. These two rocking shafts have a two-armed lever upon each end, each end of the lever being suitably connected with a foot button just above the floor of the car and within easy reach of the drivers foot.

The manner of operating is as follows: The driver grasps the shipping lever which stands upright before him, and throws it over to the right or left, until it slips into a notch provided in the railing. This causes one brake wheel to engage with the car wheel upon that side. The driver then presses his foot upon the proper foot button, which causes the rocking shaft to clamp the brake shoes upon the brake wheel not engaged with its car wheel. The motion of the car wheel must now wind up the spring coiled around the axle, until the resistance of the spring stops the car. The driver then clamps the brake shoes upon the brake wheel which is engaged with the car wheel. To start the car the driver again grasps the shipping lever, and throws it in the opposite direction until it slips into the notch provided. This disengages the brake wheel first engaged and causes the opposite brake wheel to engage with its car wheel. The driver now, by pressing the proper foot button, unclamps the brake shoes from the brake wheel just engaged, and the spring in uncoiling exerts the same force to start the car which it received from the momentum of the car while stopping it. It can be used as a friction brake in descending a hill, for instance, when the starter is not needed, by clamping the brake shoes upon the engaged wheel and leaving the other open. It can be applied to one or both axles as may be required. The starter can be wound up for use when the end of the line is reached, and after hitching his horses to the other end of the car, for the return trip, the driver can use the starter from this end as readily as from the other.

The inventor of the Car Brake and Starter is Arthur S. Dickinson, No. 144 State street, Springfield, Massachusetts.

Help for the Horses.

PATENT No. 284,948, called Car Starter, J. G. Crate, of Woodstown, New Jersey, and J. F. Morell, of Camden, New Jersey, patentees, is a device intended for use, especially on street cars run by horses, to save the strain on those animals in so frequently starting the car, by which so many of them are broken down. It is constructed to gather and hold the power required in arresting the momentum of the car in stopping it, and to apply that power when needed to start the car. It is simple in its parts and easy of application.

There are two beveled cog wheels at suitable distance from each other, made fast on the axle of the car, so as to turn with it. A revolving rod runs the whole length of the car just above the axles, with a beveled cog wheel made fast on it at a point to act on either of the cog wheels aforesaid on the axle, at the will of the operator. Said rod is pivoted in the center in a yoke, so as to admit of the lateral motion needed in being acted between said wheels. A powerful spring (or several springs if necessary) is made fast at one end to the rod, and at the other end to the top of the yoke in which the rod is pivoted. In this spring the power is gathered in stopping the car, by the revolutions of the rod, when the wheel made fast to it is thrown in contact with the proper wheel on the axle to do it. And from this spring the power thus gathered is projected in starting the car when needed for that purpose, by throwing said wheel in contact with the other wheel on the axle of the car. Each end of said rod connects with and revolves in the lower end of a lever, which descends beneath the floor of the car, and is operated from above by the driver at will, in throwing the wheel on the rod in contact with either of the wheels on the axle. To hold the power in the spring when it is wound up, and give perfect control of it till needed for use, a ratchet wheel is made fast to each end of the rod, which locks with a dog, which dog is acted upon by a spring to hold it to its proper work upon the ratchet wheel while the motion of the car is being arrested. When the power is needed to start the car the dog is thrown out of position by the pressure of a small lever which, like the dog itself, is pivoted on the main lever to hold the rod wheel firmly in contact with either wheel as needed in stopping and starting the car, or centrally between them when not thus in action; there is a device connected also with the main lever and operated by a pressure of the foot, by which it is made secure in either of the three positions desired. The object in having ratchet wheels and the apparatus described at both ends of the rod instead of at only one end, as also in pivoting the rod at the center, is to provide for running the car in either direction. When running in one direction the dog at the opposite end is thrown out of contact with the ratchet wheel, and the rod is left to be operated from the forward end, the order of which is reversed when the car is run in the opposite direction. It is manifest, therefore, that on cars designed to run only in one direction the rod can be terminated at the center of the car, and have the apparatus for operating it at only one end.

While the prime design of this invention is to save the waste of horses so obvious in starting street cars, the patentees claim that by means of the perfect control their invention gives of the power, in carrying it any distance desired and using it at will, it can be made very useful on common road vehicles in a hilly country, in helping the horses with a load up hill with the power gathered in the spring in a previous descent. They also claim that it is capable of being applied to steam car roads with benefit, in saving the extra feed used on roads where frequent stops are made. It is almost noiseless in its operations and free from sudden jerks.

THE CHECK-REIN.—"The horse has to work very hard for his living, and he has a right to be so harnessed as to do his work in the way most easy to himself. It is heartless to set a poor beast to work his hardest, and tie him up into a cramped position that he may look handsome while doing it."—*Dio Lewis.*

New Inventions.

TO INVENTORS.

THIS department of the JOURNAL is devoted to descriptions of new inventions applicable to railroads. We publish each month a list of the same, and invite each inventor to forward us a description of his invention, believing the publication of facts regarding them will be perused with interest by railroad men, and all interested in the development of our railroad system. *We make no charge for publishing these.*

List of Patents for Inventions Relating to Railways, Machinery, Etc.

BEARING DATE SEPTEMBER 4, 1883.

284,164. STEAM-ENGINE GOVERNOR: Frank H. Ball, Erie, Pa. Filed Dec. 27, 1882.

284,169. RAILWAY-RAIL JOINT AND LOCK: Thomas E. Billington, Des Moines, Iowa. Filed Dec. 22, 1882.

284,194. CAR-AXLE: Charles E. Eaton, Chelsea, Mass. Filed March 19, 1883.

284,195. FEED-WATER ALARM-INDICATOR: Dewitt Ellsworth, Riverdale, Mich. Filed May 1, 1883.

284,201. CAR-BRAKE: Louis Henri Hebert, St. Johns, Quebec, assignor of two-thirds to Joseph Jerome Hebert and Arthur Joseph Hebert, St. Henri, Canada. Filed May 24, 1883.

284,204. STEAM-GENERATOR: Samuel L. Hill, Brooklyn, N. Y. Filed Feb. 13, 1883.

284,205. CAR-COUPLING: Alfred B. House, Junction City, Kans., assignor of two-thirds to Jacob B. Callen and Horace E. McFarland, same place. Filed March 14, 1883.

284,209. CAR-AXLE LUBRICATOR: William J. Jackson, Osceola Mills, Pa., assignor to the Osceola Manufacturing Company, (Limited,) same place. Filed June 9. 1883.

284,250. RAILWAY-CAR STEAM-HEATER: Nicholas Slingland, Falls Village, Conn. Filed April 20, 1883.

284,260. CAR-COUPLING: Charles W. Townsend, Charleston, S. C. Filed May 9, 1883.

284,303. LUBRICATOR: Anthony Ittner, St. Louis, Mo. Filed June 26, 1883.

284,328. GAS-ENGINE: George H. Reynolds, New York, N. Y., assignor of one-half to Cornelius H. Delamater, George H. Robinson, and William Delamater, same place. Filed July 27, 1883.

284,330. CAR-WHEEL: Luther A. Roby and Samuel T. Wellman, Cleveland, Ohio. Filed Feb. 16, 1883.

284,340. LUBRICATOR· Allen W. Swift, Elmira, N. Y. Filed Jan. 27, 1883.

284,361. HEAT INSULATION OF REFRIGERATOR CARS AND BUILDINGS: Samuel K. Bayley, Boston, Mass. Filed Jan. 18, 1883.

284,365. ELECTRO-MAGNETIC CAR-WHEEL AND BRAKE: Henry M. Beidler, Texarkana, Ark. Filed Jan. 17, 1883.

284,366. NUT-LOCK: Thomas Bell, Akron, Ohio. Filed July 14, 1883.

284,395. BALANCED SLIDE-VALVE: John J. De Lancey, Binghamton, N. Y. Filed June 5, 1883.

284,415. STEAM-BOILER: David Groesbeck, New York, N. Y., assignor to the Groesbeck & Wright Spark Arrester Company, same place. Filed Sept. 23, 1882.

284,436. CAR-COUPLING: Henry M. Keith, Erving, Mass. Filed June 7, 1883.

284,438. COW-CATCHER FOR LOCOMOTIVE-ENGINES: Ezra B. Lake, Ocean City, N. J. Filed Feb. 2, 1883.

284,448. CAR-WHEEL: William I. Lindsay, Cleveland, Ohio. Filed Jan. 22, 1883.

284,453. EJECTOR: Daniel W. Magee, New York, N. Y., assignor to Ebenezer P. Miner, Hartford, Conn. Filed June 11, 1883.

284,468. SECTIONAL SAFETY-BOILER: Edward J. Moore, Baltimore, Md. Filed Jan. 15, 1883.

284,472. CUT-OFF VALVE: Benjamin F. Olmsted, Grand Rapids, Mich. Filed June 15, 1883.

284,476. CHANGE-SPEED MECHANISM: Thos. J. Perrett, Jamestown, N. Y. Filed Aug. 2, 1883.

284,504. CYLINDER-COCK: Daniel Smullen, St. Louis, Mo., assignor to the Excelsior Manufacturing Company, same place. Filed April 14, 1883.

284,520. LOCOMOTIVE ATTACHMENT: Orlando Wetmore, Nevada, Mo. Filed Jan. 12, 1883.

284,556. GAS-ENGINE: George M. Hopkins, Brooklyn, assignor to the Economic Motor Company, New York, N. Y. Filed March 31, 1883.

284,568. JOURNAL-BOX COOLER: Robert C. Morris, Olney, Ill. Filed Jan. 22, 1883.

BEARING DATE SEPTEMBER 11, 1883.

284,587. VALVE: Alexander G. Alexander, Detroit, Mich., assignor to John Gilliard, New York, N. Y. Filed March 24, 1883.

284,610. FIRE-BOX FOR STEAM-BOILERS: Edwin E. Carter, Waynesburg, Pa., assignor to Sarah E. Carter, same place. Filed June 29, 1883.

284,614. INJECTOR: Henry F. Colvin, Philadelphia, Pa. Filed Nov. 17, 1882.

284,618. TOOL FOR EXPANDING THE ENDS OF BOILER-TUBES: John F. Dettmar, Brooklyn, assignor to Richard Dudgeon, New York, N. Y. Filed May 17, 1883.

284,624. CAR-COUPLING: Jackson B. Garrett, Eagle Springs, assignor of one-half to M. Surratt, Waco, Tex. Filed May 5, 1883.

284,632. SEAL-LOCK FOR CAR-DOORS: George J. Hartman, Lake, assignor to William H. Lotz and Edward Carqueville, both of Chicago, Ill. Filed May 4, 1883.

284,635. VALVE: Charles B. Hitchcock, Indianapolis, Ind. Filed May 8, 1883.

284,644. CAR-COUPLING: Geo. Lighthiser, Napoleon, Ohio. Filed Feb. 17, 1883.

284,646. SPARK-ARRESTER: William A. Maloney, Denver, Col. Filed July 23, 1883.

284,668. INSULATED RAIL-JOINT: Theodore A. B. Putnam, New York, N. Y. Filed March 20, 1883.

284,669. RAILWAY-CROSSING GATE OR SIGNAL: Theodore A. B. Putnam, New York, N. Y. Filed Sept. 27, 1882.

284,670. ELECTRICALLY OPERATING RAILWAY GATES OR SIGNALS: Theodore A. B. Putnam, New York, N. Y. Filed April 16, 1883.

284,681. ROTARY STEAM-ENGINE: David L. Smith, Big Rapids, Mich., assignor to himself and Nathan H. Vincent, same place. Filed Jan. 5, 1883.

284,682. APPARATUS FOR HEATING CARS AND EXTINGUISHING FIRES ON RAILWAY-TRAINS: Erastus W. Smith, New York, N. Y. Filed April 10, 1882.

284,690. AUTOMATIC CAR-BRAKE: Charles Van Dusen, New Albany, Ind., assignor of one-half to William L. Breyfogle, Louisville, Ky. Filed June 30, 1883.

284,691. DUMPING-CAR: Matthew Van Wormer, Melrose, Mass. Filed April 24, 1883.

284,701. PORTABLE STEAM-ENGINE: William C. Wolfe, Hagerstown, Md. Filed June 20, 1883.

284,713. CAR-SPRING: Sumner A. Bemis, Springfield, Mass. Filed June 14, 1883.

284,716. RAILROAD-SIGNAL: George W. Blodgett, Boston, and Geo. R. Hardy, Newton, Mass. Filed Jan. 15, 1883.

284,719. OSCILLATING STEAM-VALVE: John M. Buckley, Sedalia, Mo. Filed July 2, 1883.

284,733. SLEEPING-CAR: Henri Gillaume, Washington, D. C. Filed July 2, 1883.

284,744. STEAM-ACTUATED VALVE FOR PUMPS: Louis Lamy, West Hoboken, N. J. Filed Feb. 9, 1883.

284,758. CAR-REPLACER: Albert Reed, Binghamton, N. Y. Filed March 7, 1883.

284,762. FEED-WATER REGULATOR FOR STEAM-BOILERS: George P. Salisbury and Charles W. Foster, New Haven, Conn. Filed May 22, 1883.

284,766. AUTOMATIC CAR-BRAKE: George T. Smallwood, Jr., Washington, D. C., assignor of one-half to James Henry McLean, St. Louis, Mo. Filed Oct. 5, 1882.

284,768. DEVICE FOR OILING SLIDES FOR ENGINES: Clement C. Smith, Lancaster, Pa. Filed July 20, 1883.

284,770. COMBINED CHECK AND STOP VALVE: Lexor B. Snow, Cleveland, Ohio. Filed Jan. 26, 1883.

284,789. CAR-COUPLING: Ferdinand Woodward, Sacramento, Cal. Filed June 13, 1882.

284,797. CAR-COUPLING: Addison D. Atwood and Charlie M. Atwood, East Portland, Oregon. Filed May 11, 1883.

284,800. CAR-AXLE: George W. Bedbury, Portland, Oregon, assignor of one-half to L. M. Cox and James E. McLaughlin, same place. Filed May 12, 1883.

284,819. STOCK-CAR· Alfred W. Clifford, Johnstown, Pa. Filed April 30, 1883.

284,886. CAR-COUPLING: John G. Peace and Eben B. Sankey, Salem, Mo. Filed Feb. 12, 1883.

284,896. CAR-COUPLING: Matthias Ralph, Sr., Ursa, Ill. Filed June 8. 1883.

284,898. CAR-COUPLING: Andrew J. Redman, La Crosse, Kans., assignor to himself and Clifford R. Scranton, same place. Filed Feb. 8, 1883.

284,900. DEVICE FOR CLEARING RAILROAD-CUTS OF SNOW: William C. Rice, Oakland, Iowa. Filed April 25, 1883.

284,902. CAR-COUPLING: Francis H. Richards, Springfield, Mass. Filed Feb. 28, 1883.

284,937. CAR-COUPLING: Jay Lamotte Williams, Lone Tree, Iowa. Filed June 11, 1883.

284,948. CAR-STARTER: Joseph G. Crate, Woodstown, and James F. Morell, Camden, N. J. Filed May 16, 1883.

284,964. PISTON-VALVE: Chas. H. Hyssong, Altoona, Pa. Filed June 18, 1883.

284,974. CAR-COUPLING: George W. Norton, Freeman, Me. Filed Jan. 2, 1883.

BEARING DATE SEPTEMBER 18, 1883.

284,997. VISE: James O. Barrett, Erie, Pa. Filed May 28, 1883.

285,042. CAR-COUPLING: Charles J. Langenbach, Dorchester, Iowa. Filed May 28, 1883.

285,047. PNEUMATIC GRAIN-ELEVATOR: Jos. Lewis, Chicago, Ill. Filed June 29, 1883.

285,068. LOCOMOTIVE-BRAKE: George Hamilton Poor, Portland, Me., assignor to the American Brake Co., St. Louis, Mo. Filed May 10, 1883.

285,082. CAR-WHEEL LUBRICATOR: Joseph Stephenson, Osceola Mills, Pa. Filed July 6, 1883.

285,084. VALVE-GEAR FOR STEAM-ENGINES: Frank M. Stevens, New York, N. Y., assignor to the Stevens Locomotive and Machine Company, same place. Filed Feb. 13, 1883.

285,100. TRAVELING CRANE: Henry M. Barnhart and Edward Huber, Marion, Ohio. Filed Aug. 6, 1883.

285,116. PORTABLE ELEVATED RAILROAD: Benjamin S. Curtis and John A. Cook, Cape May, N. J. Filed April 17, 1883.

285,122. NUT-LOCK: Samuel Gissinger, Pittsburgh, Pa., assignor of one-half to John R. Large, same place. Filed Oct. 20, 1882. Patented in England April 26, 1882, No. 1,970.

285,123. CAR-WHEEL BORING AND TRUING MACHINE: James H. Gowan, Chicago, Ill., assignor of a part to Augustus O. Hall, George H. Peeke, and William P. Black, all of same place. Filed Feb. 27, 1882.

285,142. RAILWAY-CHAIR: Charlie E. Mark, Flint, Mich. Filed Mar. 10, 1883.

285,145. CAR-COUPLING: James C. Mitchell, Lancaster, N. H., assignor of two-thirds to James A. Smith and Alden R. Tinkham, both of same place. Filed June 12, 1883.

285,158. STATION-INDICATOR: Isaac Newton Phillips, Nashville, Tenn. Filed Jan. 9, 1883.

285,173. CAR-SIGNAL: Isaac W. Stemen, Elida, Ohio. Filed March 1, 1883.

285,181. CAR-COUPLING: Savage D. Trenholm, Charleston, S. C. Filed July 6, 1883.

285,190. RAILWAY-SWITCH: John C. West, Clarksville, Mo., assignor of two-thirds to Otis N. Baldwin, same place. Filed May 17, 1883.

285,196. COMPOUND RAILWAY-RAIL: Noah D. Wright, Covington, Ky., assignor of three-fourths to Edwin R. Seely and John H. Gurney, both of same place. Filed April 23, 1883.

285,217. CAR-AXLE BOX: Russell Brewer, New York, assignor of one-fifth to Gottlieb Engels, Brooklyn, N. Y. Filed March 29, 1883.

285,219 SEAL-LOCK FOR CAR-DOORS: Edward J. Brooks, East Orange, N. J., assignor to E. J. Brooks & Co., New York, N. Y. Filed June 25, 1883.

285,228. CAR-COUPLING: Josiah P. Champion, Phelps, N. Y. Filed June 18, 1883.

285,242. SPIKE-PULLER: Keyran J. Duggan, Montgomery, Ala. Filed June 21, 1883.

285,247. CAR-COUPLING: Bevly A. Fisher, St. James, Mo. Filed June 12, 1883.

285,257. SUSPENSION-BRIDGE: Thomas F. Griffith, Arlington, N. J. Filed Aug. 2, 1882.

285,258. GRAIN-CAR-DOOR MECHANISM: John A. Hagan, Three Rivers, Mich., assignor of one-half to the Sheffield Velocipede Car Company, same place. Filed Feb. 27, 1883.

285,262. CAR-COUPLING: Clarke Hendricks, Modesto, Cal., assignor of one-half to J. R. Fenn, same place. Filed June 7, 1883.

285,271. STEAM-ENGINE: Amariah W. Jackson, Chicago, Ill. Filed July 11, 1883.

285,289. STATION-INDICATOR: Fred C. McDonald, St. Louis, Mo. Filed Oct. 25, 1882.

285,340. DISINTEGRATING-HOPPER FOR DREDGERS AND EXCAVATORS: John A. Ball, Oakland, Cal. Filed July 23, 1879.

285,352. RAIL-DOG: Jas. Findlay, Toronto, Ontario, Canada. Filed Oct. 10, 1882.

285,356. RAILWAY-SWITCH STAND: Alonzo Grinder, Altoona, Pa. Filed May 17, 1883.

285,364. CAR-LAMP: Louis W. Schaefer, Brooklyn, N. Y. Filed July 21, 1883.

285,366. STEAM-BOILER FURNACE: Byron Sloper, New York, N. Y., assignor to himself, Walter M. Jackson, and Lyman A. Cook, both of Providence, R. I. Filed July 28, 1883.

BEARING DATE SEPTEMBER 25, 1883.

285,373. SPIKE: William H. Bailey, Minneapolis, Minn. Filed February 26, 1883.

285,380. REVOLVING CAR-SIGNAL: Albert A. Bissell, Joliet, Ill., assignor of one-half to Edward R. Knowlton. Filed July 14, 1883.

285,394. REFRIGERATOR-CAR: Edwd. Z. Collings, Camden, N. J., and Chas. F. Pike, Philadelphia, Pa. Filed Oct. 20, 1882.

285,399. NUT-LOCK: William B. Eltonhead, Philadelphia, Pa., assignor, by direct and mesne assignments, to the United States Lock Company, (Limited,) same place. Filed Feb, 23, 1883.

285,406. RAILWAY RAIL-JOINT: William F. Gould, Stuart, Iowa. Filed Oct. 28, 1882.

285,419. CAR-COUPLING: Francis H. Leonard and Stephen D. Snow, Boston, Mass. Filed June 11, 1883.

285,432. LUBRICATOR: J. Vincent Renchard, Windsor, Ontario, Canada. Filed March 3, 1883.

285,433. CAR-SEAT: Arthur M. Richards and Edward Dinsley, Chicago, Ill. Filed Sept. 9, 1881.

285,453. STEAM-BOILER HEATER: Henry M. Young, Minneapolis, Minn. Filed July 26, 1883.

285,465. LUBRICATOR: Michael L. Conway, San Francisco, Cal., assignor of two-eighths to John Broderick and John A. Hamilton, both of same place. Filed July 3, 1883.

285,473. CAR-COUPLING: Aldridge C. Ellis, Birmingham, Mich., assignor of one-half to Horace A. Randall and George F. Randall, both of same place. Filed May 10, 1883.

285,497. APPARATUS FOR OPERATING SEMAPHORE SIGNALS: William W. McLellan, New Castle, New Brunswick, Conn. Filed April 14, 1883.

285,498. INJECTOR: James H. McPhail, Boston, Mass., assignor to the National Tube Works Company, same place. Filed March 23, 1883.

285,499. STATION-INDICATOR: Thomas Melrose, San Francisco, Cal. Filed June 13, 1883.

285,500. CUT-OFF-VALVE GEAR: Herman H. Meyer, Denver, Colo. Filed March 30, 1883.

285,507. CAR-BRAKE: J. Curtis Patterson, Philadelphia, Pa. Filed Feb. 10, 1882.

285,509. CAR-AXLE: Amos T. Peirce, Fairhaven, Mass. Filed July 2, 1883.

285,511. RAILROAD-CROSSING: Denison C. Pierce, Chicago, Ill. Filed Nov: 3, 1883.

285,571. ALARM-SIGNAL FOR RAILWAY-TRACKS: Jos. Clark, Green Point, N. Y. Filed Feb. 5, 1883.

285,589. RAILROAD-SIGNAL: William L. Doyle, Buffalo, N. Y. Filed Dec. 14, 1880.

285,616. CAR-COUPLING: Charles L, Hathaway, Austin, Tex. Filed July 7, 1883.

285,641. RAIRLOAD-RAIL CHAIR: John McMurtry, Lexington, Ky. Filed July 22, 1882.

285,647. FROG: William J. Morden, Chicago, Ill. Filed April 27, 1883.

285,657. STREET-RAILWAY STRUCTURE AND CAR THEREFOR: Orel D. Orvis and Nelson B. Adams, New York, N. Y. Filed June 23, 1883.

285,662. RAILWAY-RAIL LOCK: Jas. Patterson, Brooklyn, N. Y. Filed April 13, 1883.

285,671. RAILWAY-TORPEDO: Walter S. Phelps, Wortendyke, N. J. Filed Dec. 28, 1882.

285,675. RAILROAD-CAR: John W. Post, New York, N. Y. Filed July 26, 1883.

285,678. CAR-SEAT: Arthur J. E. Readio, Pawtucket, R. I. Filed Feb. 21, 1883.

285,680. CAR-COUPLING: Joel Frank Rice, Louisiana, Mo., assignor of two-thirds to W. H. Merrow and Joe Block, both of same place. Filed Aug. 9, 1883.

285,688. RAILWAY SPLICE-BAR: Morris Sellers, Chicago, Ill. Filed June 23, 1883.

285,698. CAR-MOVER: John Spengler, Clarion, Iowa, assignor of one-half to Nicholas Francis Weber, some place. Filed Aug. 10, 1883.

285,700. SAND-GUARD FOR RAILWAYS: Timothy W. Stapleton, Portland, assignor to John G. McBride, Portland, Oreg. Filed May 5, 1883.

285,701. CAR-COUPLING: Mark L. Sterling, Denver, Colo. Filed Aug. 15, 1883.

285,722. CAR-COUPLING: Christian H. Zimmerman, Le Roy, Ohio. Filed July 6, 1883.

285,737. SLIDE-VALVE; Riley Doty, Leonardsburg, Ohio. Filed July 6, 1883.

285,758. CAR-COUPLING: Isaac Kling, Louisville, Ky. Filed June 18, 1883.

Orne's Patent Car-Axle, with Independent Wheels.

THE car-axle with independent wheels, supplied by Edward B. Orne, No. 3,935 Locust street, Philadelphia, is intended to overcome the resistance of car-wheels by their circumferential slipping in going around curves of railroads. It is made of few pieces, and it combines strength, simplicity and reasonable cost.

It is composed of the axle, which is made in three sections and surrounded by the hub. This is made in two horizontal half-round pieces. When these two halves are together, inclosing the axle, they are pressed by power into the wheel, which is bored correspondingly large to receive it. The end sections are steel, and revolve only with the wheel and hub. The middle section is wrought-iron pipe, four inches outside diameter, and one inch thick in the walls. The interior of the pipe is used as a reservoir for lubricant, which is fed to the inside bearing of wheels. This middle section keeps the wheel to gauge, and brass washers between the middle and end sections take up any wear at this place. The arrangement described allows each wheel to move independently when rounding curves, and when running on straight line, both wheels and axle revolve together, which reduces the wear to a minimum.

A letter written by H. Stanley Goodwin, general superintendent for the Lehigh Valley Railroad Company, to Mr. Orne, dated September 3, 1883, gives a detailed account of the performance of the Orne Car-axle, in a concise and interesting manner. The writer says:

"I give you below the result of a test made to-day with our eight-wheel gondola car No. 6,386, fitted with axles upon which all of the wheels are loose, fitted under your direction and in accordance with your drawings.

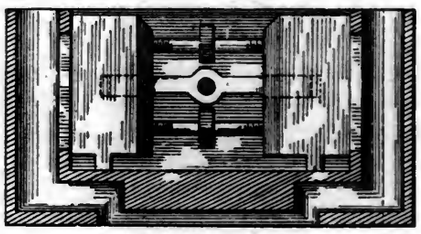
"This car was given a free run along with a car of similar build in all respects, except that the other car had wheels fast upon the axles, and of the usual construction.

"Your loose-wheel car was loaded with 40,080 pounds of old scrap-iron, and the fast-wheel car was loaded with 40,080 pounds of old wheels. Both these cars were loaded three weeks since for the purpose of this test, and have remained loaded from that time. The place where the test was made is on the up-track siding next above Bethlehem Station, and the line from the starting point is as follows: First a curve with a radius of 997 feet for a distance of seven rails; thence a straight line of three rail lengths; thence a curve to the right with a radius of 764 feet, for a distance of 24 rail lengths, making a total of 47 rail lengths from starting point; thence a tangent of five rail lengths and thence a curve to the left with a radius of 1,207 feet to a point beyond the farthest point reached in the test. The grade of this track for the whole distance is nearly uniform, and at the rate of about $\frac{227}{100}$ feet per mile, and may be called practically level. Both these cars are gondolas of L. V. R. R. standard pattern, and both built with center bearings which hold the body clear from any side bearing.

"The tests were conducted as follows:

"First: With the fast-wheel car ahead and the loose-wheel car behind, the cars not being coupled. An engine gave them a push and they ran close together a distance of 47½ rails; and again in the same manner a distance of 56 rails, and stopped touching each other; the loose-wheel car bumping the fast-wheel car from time to time during the runs. The cars were next shifted, and the loose-wheel car was placed ahead with the rigid-wheel car in the rear, and the two were pushed in the same manner as before. On the first run, the loose-wheel car ran 69 rails, and the fast-wheel car 58 rails; on the second run, the loose-wheel car 69 and the fast-wheel car 58; on the third run, the loose-wheel car 70 and the fast-wheel car 60; fourth run, loose-wheel car 45, fast-wheel car 39½; fifth run, loose-wheel car 45½, fast-wheel car 39½. The testing was then discontinued."

Calver's Balanced Slide-Valve.



TIMOTHY CALVER, of Portsmouth, Ohio, is the patentee of this invention, of which the accompanying cut is a transverse sectional elevation showing the valves, which are arranged in duplicate within the steam chamber, and are connected together by right and left threaded bars, so as to be laterally adjustable, and to provide for the wear of the working parts. The ends of the yoke rest loosely in slots or openings made in the inner faces of the valves, so that they may slide for lateral adjustment. This arrangement also connects the two valves so that they will reciprocate in unison, by means of the valve stem whose inner end is attached to said yoke in any suitable manner. The tongues or ribs on the under side of the valves are intended only to relieve the friction as much as possible.

In employing the two valves and two sets of steam ports in the steam chamber, the effect of the steam upon the valves is uniform, and it can be admitted to the cylinder and exhausted therefrom in greater volume.

Mr. Calver's leading claim is: In combination with duplex slide-valves cut away to give a minimum bearing upon the seat, right and left threaded bars or screws connecting said valves, and means of adjusting said screws to take up loss by wear.

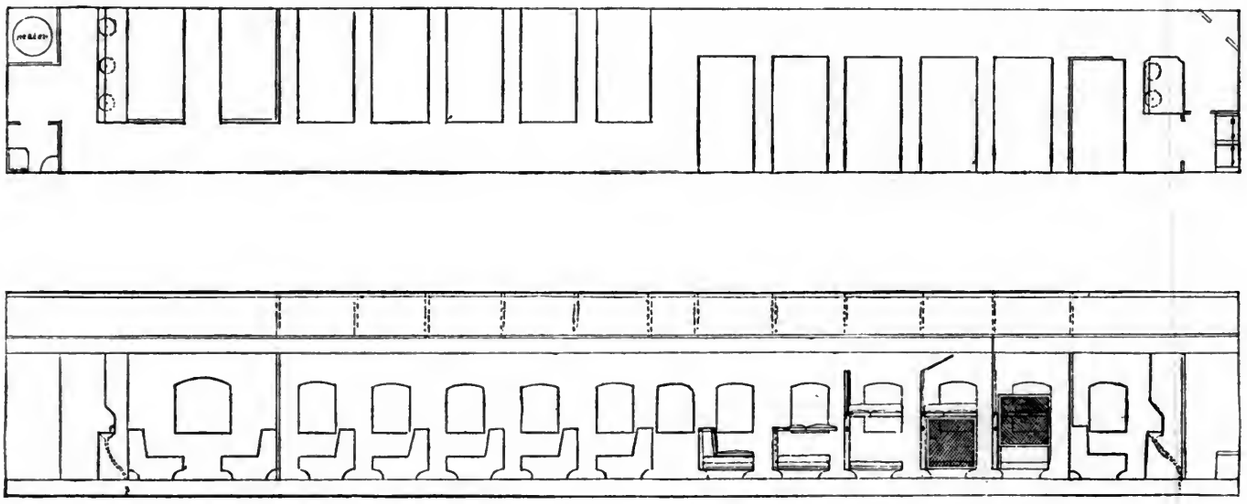
A New Nut-Lock.

MR. JOHN PARR, of Humboldt, Nebraska, is the inventor and owner of a nut-lock, Patent 288,114, which is a simple invention. It consists of a plate of malleable iron with holes in it the size of the bolts to be placed on it. The bead-plate is bent outwards the thickness of the nut it is to be used on, and then it projects upwards at the side of the nut, from a quarter to half an inch, according to the size of the nut, with open spaces along it for each nut to be put on or taken off. The bead-plate is made from one-eighth to one-quarter of an inch lower than the nut it is to secure, to admit the passage of a straight key to pass under the nut and throw the flange off the bead-plate. The nut-lock can be made to fasten one or more nuts at a time. The invention was made expressly for the rail-joint providing that one plate and one key will lock the four nuts.

A Revolution in Sleeping Cars.

PROMINENT railroad men just now are showing much interest in a novel invention by John A. Sleicher, formerly one of the editors of the Troy, N. Y., *Times*. He has patented in this and other countries, what he calls a "State Room Sleeping Car." By a very novel but simple device he so transposes the seats at night as to make a comfortable state room of each section. The explanation of the invention is briefly as follows:

Each seat is six feet long and extends from one side of the car to within about 2½ feet of the other. The aisle are thus left at the side of the car instead of in the middle. Half of the seats are arranged on one side of the car and the other half on the other side. The back of each seat is about three feet high. During the day-time the seat looks like a handsome easy lounge, and at night it can be quickly transformed into two roomy berths. The lower berth is the seat itself. To make it the necessary width for sleeping purposes, the seat and seat back are turned up into a horizontal position, leaving the full width of the seat underneath exposed. It is three feet wide and forms a comfortable lower berth. The upper berth is made of the seat-back and seat itself as they lie turned up into a horizontal position, affording a width of fully three feet. Under the seat during the day-time are two mattresses, or wide cushions, lying upon a spring-bottom. One of these mattresses is thrown upon the upper berth to make a comfortable bed, while the other, left upon the spring-bottom underneath, makes an admirable lower berth. The berths, it will be seen, extend transversely across the car. The ingenuity of the inventor is further displayed in the storage of the pillows, blankets and curtains in the space left behind the seat-back when it is turned down during the day-time. The advantage of complete isolation for each section is obtained by means of sliding panels or double backs to the seat-frames. These panels when elevated, form, in connection with projections from the roof, partitions, across the width of the car and thus leave each section of two berths snugly cut off from the others. A passenger in his own state-room can enjoy the great luxury in a sleeping car of standing erect by the side of his berth and preparing at his leisure without fear of intrusion, for his night's rest. Travelers, especially ladies, who have ventured into an ordinary sleeping car and tried at night to disrobe while half reclining, half standing, in the public aisle, jostled by every passer-by, will appreciate the special advantage of the state-room car. The inventor claims it is more comfortable to sleep across the car than lengthwise of it. He has sought also to render travel safer. His car certainly embodies precautions of value in the matter of safety from fire. In the first place, the heater is inclosed in a compartment near the door at one end of the car. This compartment is lined with boiler iron on all sides. The stove might be broken to pieces, yet the burning coals could reach nothing inflammable. As a further and very important safeguard, the water-tank in the gentlemen's toilet room extends across the car directly beyond the heater. It reaches almost from the roof to the wash bowls, and the water runs by gravity. In case of a collision or wreck, it is claimed that the bursting of this superimposed tank would flood the car, especially the part near the heater. No kerosene will be used in the new car, as wax candles or gas will furnish the illumination. Railroad men say that one of the most important and valuable points about Mr. Sleicher's car is the absence of the ponderous upper berths, which in ordinary sleepers are swung up into the roof and there held by heavy springs or weights. The Sleicher car is at least 5,000 pounds lighter than a Pullman or a Wagner car of the same size, and much easier to ride in as the weight is all near the floor, and not upon the sides or roof. The inventor claims a saving of over 25 per cent. in the cost of building one of his cars in the highest and most artistic style, compared with the cost of an old-fashioned sleeper, and yet his car will accommodate about the same number as a Pullman or Wagner car of equal size. The economy in weight is a vital matter. Sleepers, as now built, are so heavy that a locomotive can draw but few of them in one train. The inventor has been in consultation at the St. Nicholas Hotel with several capitalists, who are much interested in the new invention. All concede that it has decided merit and value. Mr. Sleicher is at present in charge of the New York State associated press office in this city, with headquarters at the Western Union building.



SLEICHER'S SLEEPING-CAR.

The cuts at the head of this article show first a ground plan of a state-room sleeping car, and second, a sectional view of the car.

The first cut shows the arrangement of the seats and aisles, with the gentlemen's toilet at the left adjoining a smoking compartment, and the ladies' toilet apartment on the extreme right.

The second cut shows at the left the seats as they appear from the aisle. On the right, the ingenious process of changing the seats into berths is displayed. It will be seen that the supports for the upper berths (which supports, in the day-time, lie folded under the seat-cushions) are covered with wire netting to protect the occupants of the berths from intrusion. The panel rising from the seat-back, and with its spring flap forming a partition between the sleeping sections, is also clearly shown. Each section has its own ventilators at the side of the roof, which can be opened or closed by the occupant.

It strikes us as very strange that these simple devices for making a sleeping car perfect in all its appointments, were never thought of before. It will be stranger still if "the state room sleeper" does not, within a short period, supplant the ill-ventilated, top-heavy, uncomfortable coaches that have so long been tolerated by a patient and submissive public.

Rowing for Health.

IT is agreed by all competent authorities who have made the study of health and its laws a special field for observation and inquiry, that foremost among the exercises for physical development, rowing occupies a prominent place. Indeed it is a question whether there is any other system of exercise which will compare with it, and the highest types of physical development have been seen among those who have been dextrous with the use of the oar. While the class of professional rowers is a large one, and the athletic spirit which now is so strong in all ranks and classes of society, is having the effect of constantly making accessions to it, yet the catalogue comes far from showing the vast number that are "paddling their own canoe" for health and recreation. Comparatively few, however, can enjoy the privileges of the boat and the water, and occasional or spasmodic turns at the oar do more harm than good, for the trouble is that those unable to boat but infrequently, go at it so violently that they strain and overexert themselves, on the principle that they must "make hay while the sun shines," and they receive more harm than good. It follows, therefore, that to receive the greatest good, a course of regular or systematic exercise must be followed.

There is a great variety of devices and mechanical appliances of varying merit, for supplying the public with the means of exercising "at home," for the average person is unwilling, and oftentimes unable to take the time and trouble of exercising regularly, unless the means are at his own door. It is an easy matter to form plans and good intentions for systematic exercise, but so long as human nature is constituted as it is, the proportion of those carrying them out will be about the same as with that large number who, at the beginning of the year start to keep a diary, the reader doubtless has had some experience in that line, and can therefore form a correct estimate of the successful number.

Among the many machines and gymnastic apparatus which have come under our notice, we are not aware of any which appears more sensible and practical than the invention of Professor J. M. Laflin, 266 Broadway, this city. It may be described as a home rowing machine; we shall permit the professor, however, to explain the machine, and what he claims for it in his own language:

"I am now enabled to offer my patrons and customers a Perfect Parlor Rowing Apparatus. After spending thousands of dollars, and years in experiments, with the combined help of the best mechanical engineering talent, I have produced a perfect and simple device which will not break or get out of order, as has been the trouble in my former and all other apparatuses. In my improved machine there are no springs, as the pressure is regulated exclusively by friction, and can be varied by an adjusting thumb-screw, from one ounce to 1,000 pounds, at the will of the operator. The clutching or gripping device to which the oar is attached, is simple and positive in its movements, and allows the operators to rest their hands upon the oars, and feathering same when coming back in the same manner as ordinary rowing. As each oar is provided with an independent friction, the operator can let either oar rest and apply both hands to one oar, and pick up the other at any time again. And I have so arranged the machine that by changing the out-rigger and oars about on the frame, the pushing of the oars may be practised similar to the style of the Norwegian sailor, which is the best exercise for developing the muscles of the back and stomach. To show the confidence I have in my machine, I will warrant it for five years. Each machine is provided with a counter or indicator, which is so graduated that one revolution of the dial is equivalent to one-quarter of a mile as calculated from Hanlon's time, thirty-two strokes per minute, and which will be found of great benefit in regulating the time spent in this exercise."

A few of the good features of this rowing machine are that it is inexpensive, takes but little room, and being light, can be moved from place to place at pleasure.

Circulars and full information, together with a pamphlet on Physical Culture, can be had on application, by addressing J. M. Laflin, 266 Broadway, New York City.

The Minnesota Steam Scraper.

VINE D. SIMAR and John Dale, of St. Paul, are the inventors of this machine, which is said to do its work more quickly and more effectively than an ordinary steam shovel, and can be built or purchased at about one-half the cost. Being constructed on the dredge plan, there is no loss of time in lifting the dirt, as it operates continuously. It is a sort of a drag-scraper on wheels, run by steam power. The scraper arm is twenty feet in length, and has six scrapers attached to an endless chain. The movement of these scrapers carries the dirt to an elevator that has combined cutters and buckets. This elevator takes the dirt carried to it by the scrapers, and also picks up the dirt which is scraped toward it, but is not actually carried in the scrapers themselves. At the top of the elevator there is a chute which delivers the dirt anywhere within a radius of twenty feet. The new scraper handles its work with great facility, as it is mounted on a turn-table, so that the scrapers can work all around the point where it stands. The scraper-arm can be raised or lowered, so that it can be worked below grade. In widening a track it can be put at right angles to the track, the arm run out to the bank, and the dirt carried directly on to a cart placed in the rear of the elevator. On prairie roads it can be so worked as to borrow from either side and put the dirt right on the embankment. It is not expensive to work. Ordinarily the engine and boiler of a steam shovel weighs from 5,400 to 5,700 pounds. This scraper is rigged with a boiler and two upright engines that only weigh, in all, 2,700

pounds, yet are so geared as to furnish twenty-four horse-power. The use of two engines does away with the necessity of a fly-wheel, as there is no dead center to overcome.

Improvements in Wire Suspension Bridges.

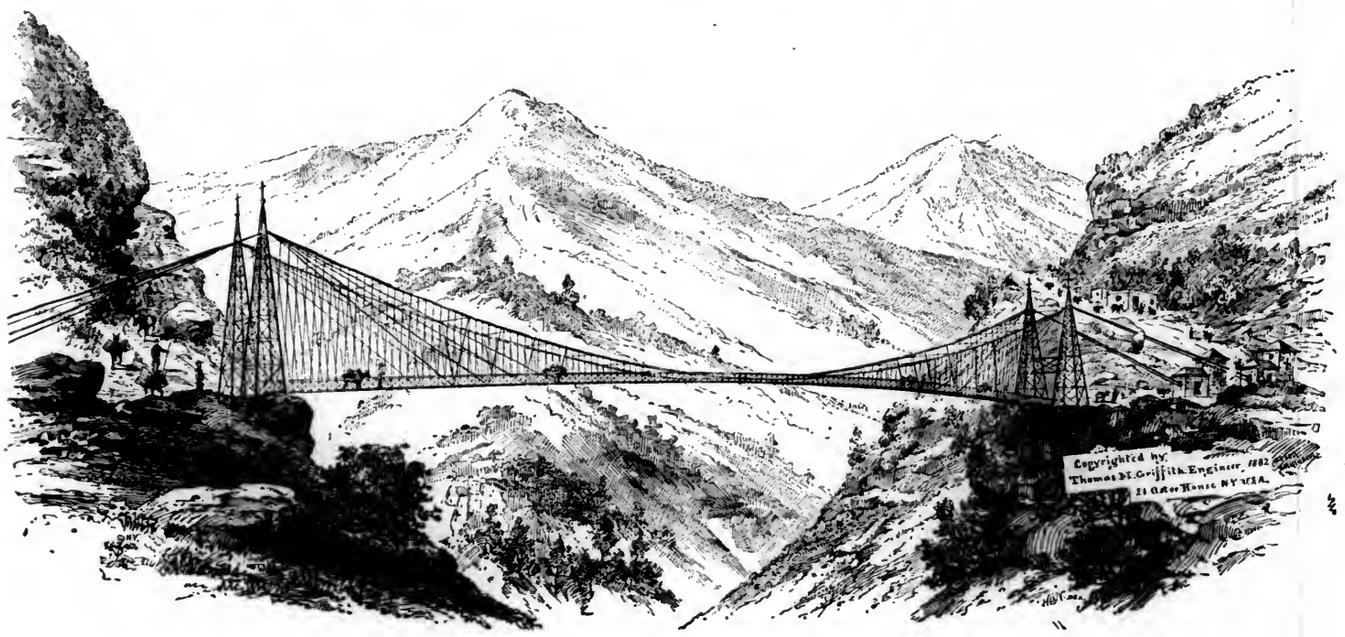
On the eighteenth of September last a patent was granted to Thomas M. Griffith, engineer of the New York Wire and Wire Rope Company, office No. 2, Astor House, for improvements in wire suspension bridges. Said improvements are deserving of particular mention.

The suspension bridge is a very ancient device, having been known in China at an early date, and later in South America, where it was constructed in a rude way of a species of vine for the passage of pedestrians and animals. In later times, engineers have made efforts, with more or less success, to adapt the principle of suspension to the requirements of modern locomotion, and to render these vibratory structures stable and free from vibrating motion. Various means have been adopted for this purpose. The bridges have been made heavy in proportion to the load they were to carry. They have been stiffly trussed, and an English engineer, a Mr. Dredge, has applied a system of diagonal rods. Stays reaching from the top of the tower to the platform, and called floor-stays, have been adopted. Some of these experiments have partially accomplished their purpose; others of them have proved comparatively useless.

It is important not only for the better accommodation of travel, but for the security of a suspension bridge, that the platforms shall not be allowed to vibrate greatly, as by so doing, after a certain point of vibrating motion is reached, the platform and cable will not vibrate in unison. Owing to the larger surface of the first in comparison to its weight with the last, it must fall more slowly than the cable, and at those points half way between the center of the bridge and the towers or points of support, where the motion is the most violent, the suspension rods will be broken. When a few are broken, the destruction of the bridge is almost certain to follow, and a number of suspension bridges have been injured or destroyed in this way.

It is the aim of Thomas M. Griffith to overcome by his patented improvements both of the defects, indicated, and also to cheapen the cost of wire suspension bridges.

The essential features of his invention are: the placing of spars between the platform and cables, at and near the quarter points of the span, and from the foot of each carrying a floor-stay over an independent saddle on top of the tower, down to the anchorage; the placing a cushion of rubber or other elastic material between the ends of the platform and the masonry of the towers, and firmly securing the cable to the platform along the middle. It will be seen that when a passing load reaches the quarter, there will be a tension upon the floor-stay and a compression upon the rubber cushion which will materially assist in supporting the quarter.



TUBULAR TRUSS AND TOWER SUSPENSION BRIDGE.

Again, in case the platform is shaken by a storm, and when the quarters at either side of the center are alternately rising and falling, the device described will check such motion, and the spars will compel a uniform motion of the cables and platform, rendering it impossible for the suspension rods to become slack, and consequently avoiding the possibility of a jerk. It will be seen that a very light suspension bridge may be made quite secure by these appliances, and that however violent the motion may become, there may be a reasonable hope for the safety of a structure which without them would be certain of destruction.

Another feature of the improved Griffith bridge is, that the floor planks are made quite narrow and slightly separated from each other, and the edge of the same chamfered so as to relieve the platform of upward lift by wind, in the same manner as a banner suspended across a street is relieved from the danger of being lifted and whirled over, by piercing it with a few holes to allow the wind to pass through it and relieve the pressure upon it. These devices may be placed upon any suspension bridge, light

or heavy, and upon those having any kind of trusses.

But the Griffith inventions go further, comprehending a novelty in bridge construction which in many localities, is very desirable.

All of the improved bridge is made of small pieces which can be easily transported from the factory to the proposed site; and it can be speedily erected by ordinarily intelligent labor, directed by one or two skilled persons. The towers and trusses are made of wrought iron tubes connected by couplings, and braced by tension rods.

This style of bridge would undoubtedly be useful for street car lines or in places where cars will be driven by electricity, which recent experiments in New Jersey have demonstrated to be practicable.

Heretofore, suspension bridges have been regarded as expensive structures, but Mr. Griffith claims that with his improvements they can in many cases compete in cost, safety, and durability with other bridge structures, while they are certainly light, graceful, durable and elegant. Their strength may be proportioned to the kind and quantity of travel required.

We observe that Mr. Griffith's name appears among the engineers who have built the finest suspension bridges in the world. He was associated with S. Keifer as assistant engineer in the construction of the bridge over the Niagara Falls, and was the engineer of the first Minneapolis bridge, Oil City foot-bridge, the fine bridge at Waco, Texas, and that eminently beautiful structure, the new suspension bridge at Minneapolis.

Smith's Ash-Pan for Locomotives.

LOCOMOTIVES are at present supplied with an ash-pan for catching the cinders and ashes as they drop from the grate bars, the said ash-pans being made with a solid bottom, and the cinders and ashes remain within the pans until they are taken into the repair shop and cleaned. The cinders are then left at the side of the track until a sufficient quantity accumulates, when they are shoveled into a train of flat cars and hauled away for ballasting some part of the road bed. When running through snow and snow-drifts, the pan catches up the snow, which, mixed with cinders and ashes, freezes and forms ice, which fills up the front of the ash-pan and prevents proper draft to the fire in the fire-box, and often necessitates the stopping of a train that it may be removed.

The object of the invention made by C. F. Smith, of Bay City, Michigan, is to provide an ash-pan that may be emptied at any point along the road while the train is in full motion, and at the same time distribute the ashes and cinders without extra expense or labor; also, to provide a device by means of which the snow and ice can be thawed out by hot water from the boiler, and at the same time wash out the bottom of the ash-pan and quench any fire that may have dropped into the ash-pan from the grate-bars.

It consists, mainly, in an ash-pan constructed with a number of leaves, so arranged that when closed or placed in a horizontal position they form a closed level bottom for the ash-pan, and when tilted they allow the contents thereof to drop between and fall to the ground; also, an arrangement of a pipe so constructed as to allow a number of jets of hot water and steam from the boiler to flow over these leaves or the bottom of the ash-pan, for extinguishing the fire and thawing out the snow and ice accumulated therein.

Device for Oiling the Guides of Upright Engines.

CLEMENT SMITH, of Lancaster, Pennsylvania, has sent us the following interesting communication:

LANCASTER, PENNSYLVANIA, Sept. 19, 1883.

Messrs. Phenix Publishing Company, No. 245 Broadway, N. Y.

GENTLEMEN:—Some months ago I completed a small yacht engine, and had it running in my shop on trial. It had, like numbers of small engines in the market, neither oil cups or drip cups for the guides. I had it running but a short time before I found out that the guides were constantly becoming dry, and once, while I was attending to something else, they cut so badly that I had great trouble in getting the marks out.

It seemed to me, that if I could devise something that would keep the guides constantly oiled, and at the same time neither be liable to waste the oil nor stop feeding, it would be a great advantage over the oil cups now used. I at length hit upon the following contrivance, which has been working to my entire satisfaction on the vertical engine that runs the shop. In the center of the lower end of each cross-head shoe, I screwed a wire about 3-16 of an inch in thickness, and of sufficient length to reach nearly to the bottom of a couple of drip cups, at the lower ends of the guides. The wires were bent so as to just graze the guides. Now, if oil is poured into the drip cups, at every down stroke the wires attached to the shoes, or gibs, of the cross-head will dip into it, and at the up stroke deposit a small quantity on the guides as they pass over them. After the engine has run a few moments the guides will be saturated with oil. In order to secure the superfluous oil from being wasted, the guides should be cut under at the bottom, so it will drip back into the cups. Thus you perceive that the same oil may be used over and over again, without any waste. When the engine stops, the oil drops off from the guides into the cups, and is ready for use at a moment's notice. The cross-head gibs should have grooves on their faces in the shape of inverted V's. The grooves should meet just under the dip wires, thus having a tendency to spread the oil over the surface of the guides. I remain yours truly,

CLEMENT SMITH.

Noiseless Car Wheels.

AN invention having reference to an improvement in wheels for railroad cars is of equal importance in the making of light wheels for horse-cars. Its design is to prevent what the inventor calls "the jar and hum" of the car wheels now in use.

The philanthropic inventor, for whom numberless "God bless you's" are in store, provided his device is found to be practicable, is James M. Whiting, of Providence, Rhode Island, assignor of one-half of his patent rights to James Carroll and George C. Elliot, of the same city. His improvement consists in a peculiar and novel construction, by which the jar of the wheel is deadened, and a limited amount of elasticity is secured in it, and combines, with a cast-metal spider, separate cast-metal blocks, one between each two arms of the spider, elastic material between the spider and blocks consisting of india-rubber, rawhide, prepared paper, or any similar material, and the tire which embraces and holds all the blocks in position.

It is obvious to mechanics that the parts may be secured together in various ways.

A WRITER in the *Century Magazine* says that the twenty-two thousand acres of New York City, included on Manhattan Island, only brought the Indian proprietors about twenty-four dollars in the year 1626; a township in Maine was purchased for a hogshead of corn and thirty pumpkins; and an extensive tract in Woodbury, Connecticut, was long called Kettletown, from the fact that it was bought for a brass kettle.

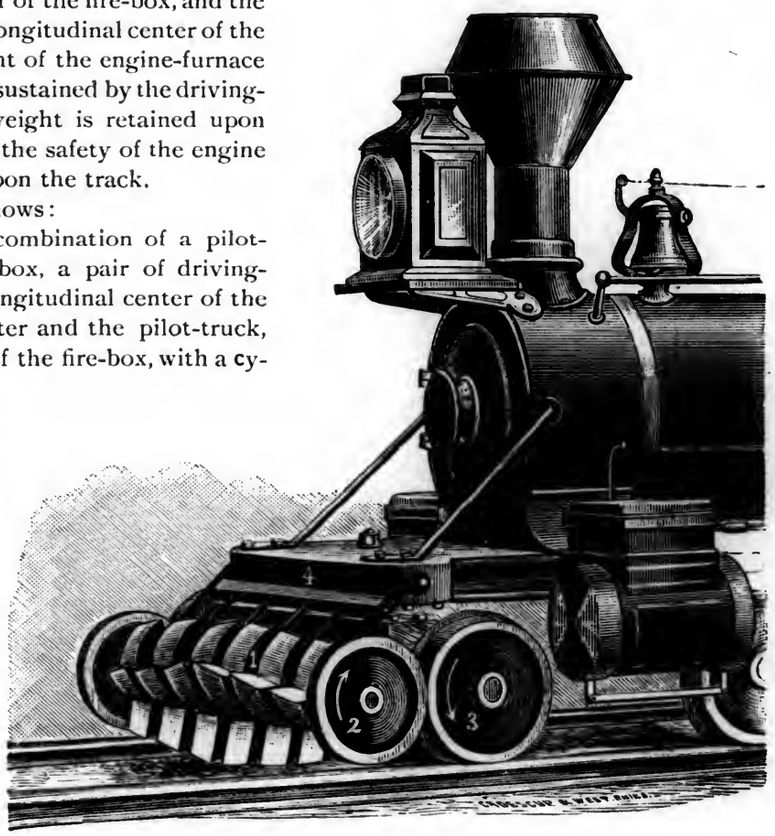
The Daniel R. Murphy Locomotive.

DANIEL R. MURPHY, of Newark, Ohio, has taken out a patent on his newly-invented locomotive, which his friends claim will pull a larger train and at a greater speed than any locomotive now in use. The principles of its construction are increased weight on the drivers and an enlarged heating surface. Mr. Murphy has assigned one-half to Gurdon B. Johnson, of Granville, Ohio.

In the Murphy locomotive, the steam-cylinders are placed between the driving-wheels, and has for its object the proper relative distribution of the weight upon the pilot and driving-wheels. The major portion of the weight is sustained by the driving-wheels, one pair thereof being placed in the rear of the fire-box, and the other pair in front of the longitudinal center of the boiler, whereby the weight of the engine-furnace and its appurtenances is sustained by the driving-wheels, while sufficient weight is retained upon the pilot-truck to insure the safety of the engine while rounding curves upon the track.

The claim reads as follows:

In a locomotive, the combination of a pilot-truck under the smoke-box, a pair of driving-wheels in front of the longitudinal center of the boiler, between said center and the pilot-truck, and one pair in the rear of the fire-box, with a cylinder equidistant from said driving-wheels, and having a piston therein, provided at each end with a piston-rod, a cross-head, a connecting-rod, and the crank-pin, projecting from the driving-wheels, whereby the weight of the locomotive is distributed upon the pilot-truck and the driving-wheels, and the latter are revolved together.



LAKE'S COW-CATCHER.

Lighting Cars by Electricity.

GEORGE D. BURTON, New Ipswich, New Hampshire, is the inventor of an improvement in apparatus for lighting cars by electricity, by means of which not only the exterior and interior of the train, but the track in advance of it, are adequately illuminated. He has secured letters-patent protecting his invention.

In Mr. Burton's system of electrical lighting, the locomotive carries an electrical generator and actuating engine for it, driven by the steam from the locomotive boiler, one terminal of the said generator being connected with the wheels, and through them with the rails of the track, which forms a ground or return-circuit wire. The other electrode is connected with the wire circuit including the various lights. One light is placed at the front of the locomotive, serving as a head-light, and another one is placed on the cab, with its rays directed backward to illuminate the exterior of the train, while each car is provided with a light for illuminating its interior. Each car is provided with a permanent conducting wire inclosed in pipes running along the top of the car, and each car is provided at each end with a grounding wire passing downward through a pipe at the side of the car to a spring or brush in contact with one of the wheels. Connecting wires are used between the cars for continuing the circuit from the permanent wire of one to that of the next car, and at the rear of the train the permanent wire along the top of the car is connected with the grounding conductor at the side of the car, thus completing the circuit to the wheels and axles and rails; and back to the other electrode of the generator connected therewith. The lamps within the cars have their electrodes included in the circuit of the permanent wire along the top of the car, and are suspended by springs in a suitable frame-work connected with the car, so that the vibrations of the car will not be transmitted to the lamps.

Lake's Cow-Catcher.

THE operation of this invention, patented by E. B. Lake, Ocean City, Cape May County, New Jersey, is substantially as follows: The cow-catcher is hinged fast to the frame (4) of the locomotive, and can be raised or lowered so as to bring the spur wheels (1) and friction wheels (2) as near the track as may be desired. The friction wheels (2) at the same time rest upon and against the pilot wheels (3), so that when the engine is in progressive motion the pilot wheels (3) revolve in the direction shown by the arrow, causing the shaft carrying spur wheels (1) and friction wheels (2) to rotate in the opposite direction as shown by the arrow.

The spur wheels (1) are of such radii that their points when in the lowest position of their revolution are on a plane with the tops of the rails on which the pilot wheels (3) run, or as much below or above as may be desired. Said spur wheels (1) are beveled, those on the right of center inclining or sloping to that side, and those on the left of center inclining to that side. Thus everything found on the track and struck by the cow catcher will be thrown to the right or left; and should the cow-catcher come in contact with a cow or other obstruction on the track, the spur wheels (1) will throw it upward and outward, thereby avoiding the danger of derailing the engine, or throwing it or the train from the track.

ADVERTISE in the AMERICAN RAILROAD JOURNAL.

Blessing's Steam Pump.

A RECENT invention of James H. Blessing, Albany, New York, treasurer and secretary of the Albany Steam Trap Company, relates to an apparatus for avoiding or diminishing the jar or concussion occasioned by the operation of steam pumps; and it consists in an apparatus by means of which the movement of the water is gradually started and stopped at each end of the stroke.

The steam cylinders used in the improvement are of the common three-posted kind. A pump cylinder and four pistons connected in pairs together by their own rods, are all the additional parts necessary to mention in the attempt to describe Mr. Blessing's invention.

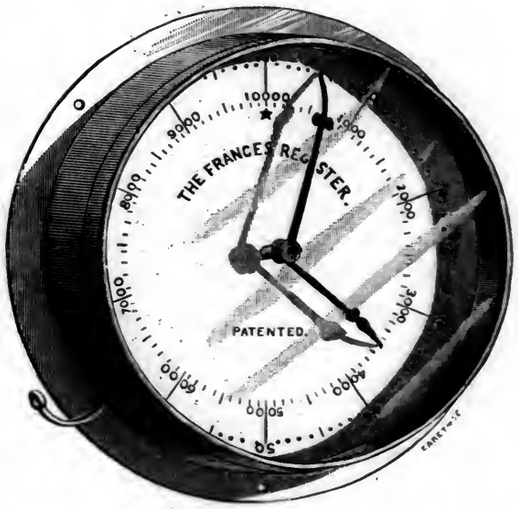
The combined area of the pistons shown being stated as 100 and the area of the outer one two-thirds greater than the inner one, and the combined areas of the water end one-half the combined areas of the steam end, namely, 50; and the area of the outer piston to be ¾ greater than the area of the inner one, they are so proportioned as to insure the moving of the small or inner first, or ahead of the outer when the steam is first admitted, commencing its stroke. The two small pistons are connected together by a rod inside of the hollow rod that connects the two outer pistons, and the operation is as follows:

When, the pistons being in position, just beginning the stroke, and the water end of the apparatus filled with water, the steam has entered the space between the cylinder head and the steam piston, the pressure will first act on the small piston to move it, and the proportionate area between the two small ones being greater than the two large ones, it will continue to move in this direction until stopped by the head or closed end of the piston. In the meantime the small piston in the water end has been forced towards the open end of the large water piston, and finally comes to rest when its outer face is even with the face of the large water piston.

During this operation the water in the small cylinder has been forced out into the large cylinder, filling any vacant spaces there may be, and also filling the discharge passage and lifting the discharge valve from its seat. Now, as it were, both pistons become solid and move together until one end of the rod connecting the two small pistons comes in contact with the head of the pump cylinder, thus preventing the small pistons from moving any further in this direction, the large ones continuing on till they have completed their full stroke. It will now be seen how the discharging valve will be allowed to drop quietly on its seat; first, by reducing the volume of the discharge water gradually to one-half of its volume, and again by the small piston commencing its return stroke ahead of the large one. Also the velocity of the large pistons is further reduced from the fact that when moving all together, their combined areas are as 100 is to 50; after the small pistons have come to a state of rest and the large ones are completing their stroke, they are then acting as 66.66 is to 37.50. The result is that the velocity of the water at the last end of the discharge, as well as at the commencement, is so far reduced that the valves are quietly and without shock allowed to drop and be lifted from their seats.

A CAR shop at York, Pa., has built fifty cars for Costa Rica.

The Frances Registering Machine.



THIS ingenious invention, manufactured by the Frances Registering Machine Company, No. 194 Washington street, Boston, can be applied to any machine which has a motion. It will register accurately from 1 to 1,000,000, and can be easily adjusted from the number last used to the starting point at Number 1. It has no complicated parts to wear or get out of order, and is claimed to be the most simple and accurate registering device offered on the market for the price. It is used in connection with ale and beer faucets, to record the number of glasses drawn. When supplied with a lock, no person can tamper with it.

The machine is constructed as a conductor's register for steam and horse railways. For this purpose it is made smaller in size, and numbers from 1 to 500. At each number registered the indicator moves one place in the presence of those who may be near, and at the same time a bell rings, indicating that the number has been recorded.

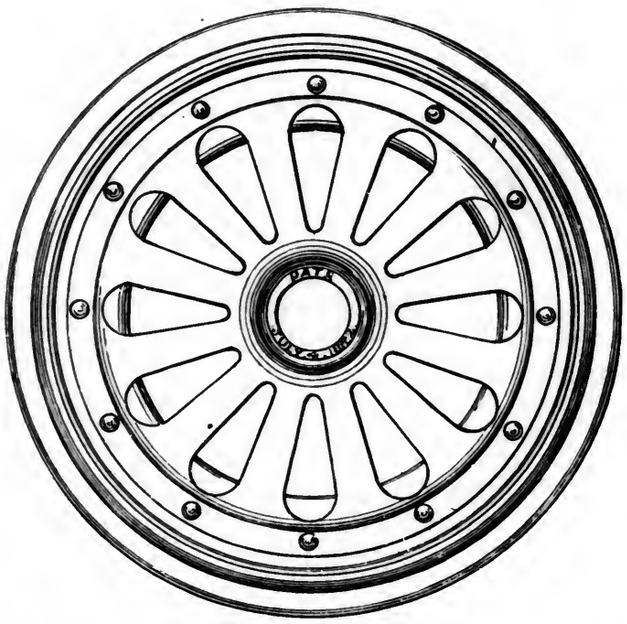
THE Car-Coupling patented by A. A. Stetson, Florida, Missouri, requires draw-heads eight inches deep and three inches thick, with inclined point and vertical walls three inches deep, beginning at the upper point of incline and running back eight inches. The latches are two and a half round iron, are hinged on the car-frame, and lie in depressions of the draw-head. When the cars come together, both latches rise on the incline and drop into both depressions, thus forming a double coupling. Uncoupling is performed by simply handling one lever. There is a lever at the top of each car and one at the side of each, which raise both latches at once by means of an eccentric.

"THE very pink of perfection"—any one of the various styles of pens manufactured by the Esterbrook Steel Pen Co.

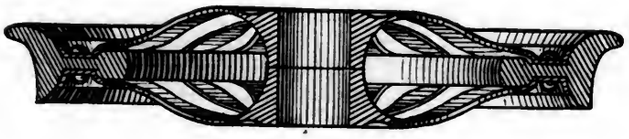
A YOUNG girl was caught kissing her sweetheart a few nights ago. Her mother took her to task for such actions, but the girl silenced her by this quotation: "Whatsoever ye would that men should do unto you, do ye even so unto them." The old lady wilted. Memories of old were brought forcibly to mind.

The Acme Steel Wheel.

ANY person who chooses to examine a freshly broken tire, rail or other piece of steel, used for analogous purposes, will be apt to find uncombined graphite, or a gas cell in the fracture. These faults can be remedied only by pressing the metal while still in a semi-molten state.



With a prompt acting press, which will gradually work up to a pressure of four hundred atmospheres before the metal gets cold enough to work in the dies of a hammer, the parts of the best wheel the world has ever known can be produced in the shape of ingots; when these parts are



hammered, they will fit each other with their skin undisturbed by lathe work to take the wear and tear of actual service.

The elasticity of the metal in all the parts, will be undisturbed until the wheel is in actual use. The tire will be inflexible and free from flaws. The web will be a perfect cushion. The weight need not exceed four hundred pounds.

Loaded with five tons, every spoke but the horizontal ones taking weight from the axle to the tire, the static strain on the metal of the web (¼ in. thick) will not exceed twelve hundred and fifty pounds per square inch of section. With these points it will aim to merit the position claimed for it.

The designer of the Acme Steel Wheel, E. B. Meatyard, C. E., Lake Geneva, Wisconsin, sends us a valuable account of the progress of his work, which we present in the confidence that it will be read with interest. He says:

"The essence of my deviation from the 'beaten line of rectitude,' lies in making the tire inflexible, absolutely circular, with its skin undisturbed by lathe-work, and perfectly balanced.

"After I got the shape, I found that I had to 'get into my hole and pull the hole in after me' to find a way to work Bessemer steel without wasting a large per cent. of the metal.

"I want pure metal with the desired per cent. of combined carbon, 'only this, and nothing more.' I have watched the tests and experiments from all sources, so far as they have been made public, for years, and can see no way to weld the walls of the blow-hole, and effect perfect homogeneity of the output but to give it every chance, chemically, under the maturing Bosic plan, omitting the introduction of silicon, and then pressing the ingots promptly while in the mold, and twice as hot as it is possible to get them in the hammer or roll.

"The Patent 283,631, is one of four different ways of making the 'Acme' Steel Wheel. Its specification shows the fallacy of trying to make its tire or nut of cast iron.

"The sheet metal for the disk must be from pressed ingots made solid by old-fashioned work, and not by the introduction of injurious agents.

"Unpressed steel castings have so much cinder and gas in them, that adequate hammering reduces their weight to a ruinous degree.

"Whereas, pure homogeneous castings weighing from 10 to 15 per cent. more per cubic foot, can be heated to a welding heat and hammered without serious loss of weight, for the reason that all the atoms of each mass have uniform and similar density.

"I do not know all of this by personal experience, but by careful comparison of published results.

"Exhaustive experiments have demonstrated that falsehood will travel 1,000 miles while truth is putting on its boots, and close observation shows that to the bilious critic,

> "'Truth is a monster of such hideous mien,
> As to be hated, needs but to be seen;
> When seen too oft, familiar with its face,
> They first endure, then pity, then embrace.'

"So I take comfort from getting along slowly in this matter, and from being the recipient of a large amount of unfair criticism."

Kasson's Lubricating Compound.

THIS celebrated compound, which is making rapid strides in public favor, is manufactured by the Kasson Bros., of the City of Buffalo, who are now turning out about one ton daily. The demand for the compound is increasing constantly, owing to the fact that grease as a lubricant is gradually taking the place of oil in many of our leading industries. It has been clearly demonstrated that where the grease compound has been used, there is a clear saving of 30 to 50 per cent. owing to the fact that there is neither drip nor gum to this Lubricant, whereas in oil there is always more or less drip or waste. The lasting qualities of the compound are two to one in its favor.

The writer has himself seen H. P. stationary engine, the eccentric and crank-pin of which have been lubricated with this compound for the past four months, and during this time has consumed 2 oz.; the engine has been used 10 hours per day, done heavy work, and run cooler than it ever did with the best lard oil. The chief engineer of the Union Steamboat Company, who have adopted this lubricant, says "that outside of the time and trouble it saves the engineer, it shows a clear saving of 75 per cent. over oil, making a total saving to the company of nearly fifteen hundred dollars a year.

The compound for railroad and tramway use differs somewhat from that used in machinery, being mixed with the best of white wool, and in that form takes the place of oil and waste, now used on railroads.

Wherever it has been tried it has shown a saving of 30 per cent. over anything ever used on railroads. It is well known that when a journal heats on a train, it necessitates a *stop*. The packing is pulled out and thrown away, and a new packing of oil and waste substituted in its place. Many accidents, sometimes called "unavoidable," are occasioned by the detention. It is also a dead loss to the railroad companies on account of the material wasted. When the compound is used, it never allows the journals

to heat sufficiently to necessitate the stoppage of a train. The heat test of the compound is 300 degrees, making it a safe agent against fire, and lessening the chances of damage to valuable machinery. It is now in use on a number of street steam railroads, and from present indications it is safe to say that it will soon be in general use as a railroad lubricant.

None but first-class material is used in the manufacture of the compound, each ingredient being a lubricator in itself. It is absolutely friction proof, and a want long felt is now supplied to the public. The price of the compound is such that it places it within reach of all needing a superior lubricant. It is put up in quantities to bring it in reach of all who need it, being in 25 and 50 pound packages, also in half-barrels and barrels. For further particulars address Kasson Bros., Manufacturers Kasson Lubricating Compound, Cor. Main and Perry Sts., Buffalo, N. Y.

THE LEARMONTH CAR-COUPLING.—It is claimed for this invention of James Learmonth, Corsicana, Texas, that it can be used without the necessity of doing away with the old-fashioned link and pin, its use being compatible with their continuance, by combining the new and the old system. The Learmonth coupling comprises the combination of two draw-heads, a spring-actuated jaw having a hole, and which acts as a support for the coupling-pin, with a spring-actuated jaw provided with a slot, and which has its outer end formed so as to act as a support for the link, both of the jaws having their outer ends to project beyond the mouths of the heads. Mr. Learmonth's patent is No. 282,910.

SAFETY RAILWAY SWITCH.—Sidings from main tracks are generally provided with a switch only at their junction with other tracks. A consequence of this is that heavily loaded cars often run down, by breaking of a brake, etc., upon the main track, or in reach of the express train on the main line, causing a collision. An invention by David H. Hoult, of Lansdale, Pennsylvania, United States patent No. 280,476, aims at the prevention of this danger; and to this end, provides the siding from a main line with a safety switch of peculiar construction, acting so as to cause cars on the sidings to run off either one or both rails of the track on to the cross-ties at some distance from the main line, whenever this is necessary in order to prevent a collision. Mr. Hoult's device, which is designed to work automatically, commends itself to full examination, by reason of its alleged importance in the saving of life and property.

MULTITUDINOUS new car-couplings include that of A. C. Long, Flora Dale, Pennsylvania, Patent No. 281,535, which couples by running the cars together, the links or hooks being always in position. It is also a self-uncoupler when the car leaves the track, but not otherwise. Ordinary uncoupling is effected by a lever which is operated in an instant. The coupling is so constructed as to couple by either end of the cars coming together. It is simple in construction.

SUBSCRIBE for the AMERICAN RAILROAD JOURNAL.

How to Get Rid of Smoke and Stop Waste of Fuel.

THE progress of invention pauses not; nothing now startles by its seeming impossibility. A hundred years ago the height of credulity was supposed to have been reached when an inventor proposed to light the streets of London with coal-smoke. Illuminating gas is now an old story. A proposition to burn water, or to run locomotives by the sun's heat would hardly be deemed impossible. The problem of our time, upon which a hundred ingenious minds are at work, is not so much the discovery of a new form of energy, as a greater economy in and control of the old ones. Steam is at once the most useful, powerful and manageable of the forces which have been yoked to the service of mankind. The steam engine has multiplied the power of man's hands, and even the delicacy of his manipulations. It is potent in the arts of war and in the arts of peace. To convert water into steam requires fuel in some form, and if the multiplication of engines goes on in the same progressive ratio it will become a question, where is the fuel to come from? Already, by a little calculation, we can predict with reasonable certainty when the coal beds of Western Europe will be worked out. All other kinds of fuel taken together are insufficient, even if they could be had, to keep down the advancing price of coal for steam purposes.

The problem is, how to save fuel; or, in other words, how to get more power out of the same quantity. There is an enormous loss and waste of fuel in all the methods in use in making steam. Science long ago determined the theoretical perfection of combustion, or, in the language of mechanics, the potential energy of a given weight of fuel. Combustion, as is well known, is simply the intermingling primarily of the two gases, carbon and oxygen; but how to get the carbon eliminated from coal or wood and so thoroughly intermixed with oxygen as to produce complete combustion whereby their volatile substance is consumed or oxidized is a discovery the world has long been waiting for. Some of the most important discoveries have been the simplest. After they had become familiar knowledge, one wonders that they had not been made long before.

Various plans have been suggested to get rid of the smoke nuisance. In the city of London, in Cincinnati, and in Chicago, municipal ordinances have been passed requiring consumers of coal in large quantities to attach some patented apparatus to their fires in order to consume the smoke. The inventions thus far applied have been cumbrous, expensive, and have had for their aim rather the diminishing of the visible smoke than its conversion into serviceable heat. The introduction of fan blasts to stationary engines, and more recently to locomotives, has increased the heat to be applied to the boilers and somewhat diminished the smoke; but with it have come two serious disadvantages: increase in the consumption of fuel, and a corresponding increase in sparks, or partially consumed coal. The loss of fuel thus driven out of the smoke stacks is enormous, to say nothing of the added cost of the devices to prevent further damage.

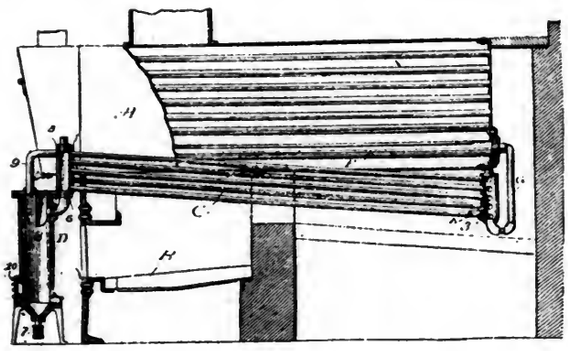
DR. GRAHAM, of Philadelphia, after studying the problem attentively from its chemical as well as the mechanical side, has hit upon a device which renders combustion complete within the fire-box, and thus avoids the double waste of smoke and sparks. The great merit and pecu-

liarity of this invention is that it proceeds upon scientific principles, the intermingling of an additional volume of oxygen with the liberated carbon, thus converting the whole value of the fuel into heat, and avoiding at the same time the smoke and spark nuisance. This discovery promises to be of the utmost importance, since it can be easily applied not only to locomotives but also to all kinds of stationary engines, stoves, and even to open grates; in fact, wherever either coal, coke, wood, charcoal, peat, petroleum or other fuel is used. It involves no complicated machinery, but can be applied to stoves and stationary engines at a trifling cost, and to locomotives for much less than is now spent in the various contrivances to arrest the outflow of sparks.

The results are experimentally shown upon oil-stoves and on heating stoves, but the principle employed is simple, automatic, and in conformity with the laws of gases. It is obvious at first sight, from the intense heat and blue flame that it is applicable to all forms of combustion. The saving of fuel alone is from 25 to 35 per cent.; and in bituminous coal it is claimed as much as 65 per cent. difference over the ordinary methods is found. The value of such a discovery need not be argued; it is self-evident.

Heater and Purifier for Feed Water.

THE conclusions arrived at by Walter McKinney, Binghamton, New York, after looking around to obtain a heater and purifier for feed water for his boiler, were: 1. That



it was important to raise the water above boiling point. 2. After raising it above that point, it must be provided that the water be at a state of rest, in order that any foreign matter might settle. 3. That a place should be provided where foreign matter might settle, if any should pass the mud drum. To obtain the desired result, the inventor of the Heater and Purifier under consideration places inside of the arch of a boiler, exposed to the hot gases of the fire, a coil or series of pipes, a series of pipes being preferable, as they can be arranged nearer the fire and take up less room if placed along one side. It is claimed that by this arrangement, if a sufficient amount of heating surface be allowed to the amount of water feeding a boiler, the water will be raised to a temperature of about 230 degrees Fah. The water being thus in a state where foreign matter would precipitate if it could be brought to a state of rest. To effect this a drum D, is placed outside, the reason for this position being so as to place it where no heat can form a current. The mud drum is upright, so that it has a sufficient depth of water. It has a deflector, so as to change and spread the current downwards, as it comes from the heater. To illustrate: take, for example, a pipe one and one-quarter inch in diameter, leading from the heater to the mud drum D, the drum D, being eight inches in diameter and three feet and a half deep. It will be seen that a current one and one-fourth inch in diameter, striking a deflector, placed just inside of an eight-inch receptacle three feet and a half deep, will have lost its velocity before rising to the top. At this point scale, etc., settles in the bottom of the drum, the hotter water rising to the pipe 9, and entering the boiler by the pipe or trough F. The object of trough F, is to catch any scale which may be carried past the mud drum, as it is well-known that where heaters are used the water very often coming in contact with a hotter mass precipitates its scale, and it lodges close to the mouth of the feed pipe, in frequent cases choking it up and preventing a sufficient quantity from entering the boiler. The pipe F, being larger and the entire length and open at the top, prevents any result of this kind. A circulating pipe G is provided to insure constant circulation when the pump or injector is not at work. Also a hand hole 10, and blow off 7, are provided for the purpose of cleaning and removing sediment. By means of the arrangement described, the inventor finds a greater economy of fuel and repairs, it keeping the boiler free from crust upon the fire sheets.

Mr. McKinney's invention has been patented.

A PATENTED invention by James L. Phillips, of Worcester, Massachusetts, relates particularly to steam valves and that class of valves known as "globe" valves, but may be applied to other similar kinds of valves. It consists in dispensing with the usual packing employed around the stem of a valve, and substituting in lieu thereof an automatic valve device, whereby the escapement of steam or similar products is prevented around said stem. All users of steam who have been troubled by the leakage of valves, will be interested in an invention promising so much. The inventor claims that by the use of his valve, described in the letters-patent as "Globe or similar Valve," enough steam to pay for it is saved in six months.

A FIRM in Paris has patented an invention for the instantaneous formation of steam, which permits of its use at once in the cylinder of the engine. A pump sends the required quantity of liquid between two plate surfaces, which are heated, and between which there is only a capillary space. The liquid spreading in a thin layer evaporates at once, without going into the so-called spheroidal state, and this steam acts in the cylinder as fresh formed steam. The speed of the pump is regulated by the engine, the pump being connected with the shaft of the engine.

SEVERAL attempts have been made to extend the smoke stacks of locomotives over the tops of the cars by means of pipes, making the point of emission the back end of the train. Could this be carried out, it would effectually cure the nuisances of smoke and cinders. But the thing has been found impracticable, for the numerous joints could not be kept together with a train jostling round curves at high speed. An inventor, all the way from Constantinople, Turkey, has now taken out a patent for a device of this kind.

Panabaker's Excelsior Car-Coupling.

THIS invention relates to that class of car-couplings which are coupled automatically by the coming together of the cars. The draw-head or buffer is attached to the car-frame in the same way as the buffers now in common use on freight cars. The buffer is divided into two compartments, the upper one of which contains a part of the new coupling, while the top and bottom of the lower compartment have vertical perforations to receive a coupling-pin, when it is desired to use the ordinary link and pin coupling. The top, bottom and sides of the upper compartment of the buffer are provided near the front ends with grooves, to receive the front ends of the guard-plates, four in number, which are coiled at the front and rear ends, forming tubes. The front tubes of all the guard-plates fit into the grooves of the buffer and receive pins. Thus the plates are hinged in their respective places. The coils or tubes at the inner ends of the plates are in the form of bevels to insure the smooth operation of the device. The upper compartment of the buffer is also provided with guide-plates secured to the inner side, top and bottom of the same, so as to guide the link in an inward or rearward direction. Between the front ends of these guide-plates, and the walls of the buffer are clamped flat springs, which bear against the inner ends of the guard-plates, and hold them closely together; without, however, interfering with their free movement on their hinges. A longitudinally sliding follower is placed just back of the said guide-plates, which a spring forces in a forward direction against the rear ends of the guard-plates, The rear end of the follower is provided with a slot to receive the end of a lever, pivoted so as to swing horizontally under the car-frame, and work in a slot in the side of the buffer. The coupling-pin slides in a tubular casing secured to the side of the buffer, and passes from the side through the buffer; and a coil-spring is placed in the tubular casing to force the coupling-pin in an inward direction. A vertical shaft is fastened to the end of the car at suitable bearings. It has a hand-wheel at the top by which it may be manipulated. The lower end of the shaft has a grooved wheel, to which is attached a chain from the coupling-pin. The under side of this wheel has a lever to be used when the operator is on the ground. A pawl is pivoted under the car-frame, the outer end of which rests against and is held in contact with the rear side of the grooved wheel by a spring. This wheel has a notch to receive said pawl.

The ordinary link, when turned on edge, may be used in connection with the Panabaker buffer. For coupling to cars having the ordinary buffer a double link should be used; for coupling cars of different heights, a link consisting of a central plate to which the semi-links are secured one above the other and on opposite sides of the central plate. The cars are uncoupled by turning the shaft either from the top of the car or from the ground, until the pawl is forced into the notch in the grooved wheel. Thus the coupling-pin is drawn out and held.

The cars are automatically coupled as follows: The link enters the buffer, passes in a rearward direction between guard-plates and guide-plates, until it reaches the follower, which it forces back. Thus the lever is forced against the inner end of the pawl, which is forced out of the notch in grooved wheel. Then the coupling-pin is forced in by the spring in the tubular casing, and the coupling made without danger to life and limb. Coupling may be withheld by setting a pawl in ratchet-wheel, if necessary.

Parties desiring further information in regard to this coupling can address P. F. Panabaker, Coon Rapids, Iowa.

Water as a Lubricator for Hot Journals on Railroad Cars.

WITH the best of oil, brasses and journals, much to the chagrin of M. C. B's and M. M's there will come hot boxes. True there is not one to-day where there were ten fifteen years ago, owing to improvements in car construction, adapting the bearings to the load, etc. But it is equally true that no railroad company but that does have trouble with hot boxes, and the older roads have "their tracks full of trains," and the increase of speed and weight of cars and loads is making the risk and trouble a serious matter. The demand for faster passenger travel, and a growing demand for faster time on stock and time freight, brings out the importance of any practical relief from hot boxes.

The idea of this invention is to supply a simple, sure, safe and practical cooler and lubricator for journals, after they get so hot and rough as to be beyond control of the train-men. It has been found that a stream of water as large as a tooth-pick, thrown against the end of a journal, or out of a pipe having a 1-16 inch discharge, the train being *set in motion*, a journal will run down cold in from twenty to forty minutes, no matter how hot or rough.

It has been *tried* on *every* bearing from engine truck to caboose, and barring some defects in the fastening to oil box, has worked satisfactorily in every case. A fastening is now made that will hold securely to any style of oil box.

The Ohio and Mississippi Railroad have been experimenting with it on some of their trains, and April 20, 1883, Capt. Peabody gave the following:

"To whom it may concern:

"We have *thoroughly tested* the Morris system of Lubricating hot journals on railroad cars, and I am satisfied it is a *good thing*, and have decided to adopt it.

(Signed) W. W. PEABODY, General Superintendent."

The device as first made and used is specially adapted to freight or mixed trains. A recent improvement consists of a tank either in the floor timbers of the car, under a car seat, or in any part of a car, with pipes leading to each box, all arranged so that if a journal begins to get hot on a long run or between stations, the water may be turned on while the train is in motion, and thus stop the heat and cutting before it gets to a danger point, or so as to injure the brass or journal.

The older device consists of a canvas bag, water-proof, and an eye bolt to screw into the floor timbers of a coach or siding of a freight car, upon which the bag is suspended. A clamp fastens the end of the pipe or ½ inch rubber hose to the oil box, all so arranged as to throw the water just where wanted. One bag of water (about six gallons) will cool *any* journal but not always smooth it—making the refilling a necessity. It is also found that a journal, however rough when water is applied, will have a very high polish when smoothed with water.

No change of any kind is required to use the bag on any car. Any railroad man who would like to look into the matter, and will send his address with a request for a bag

for trial, will receive one complete and ready for use. To any railroad company that will equip from one to ten cars with the later improvement, will be granted the right to do so free of royalty charges. It has *repeatedly* been demonstrated that cars so heavily loaded that *no* kind of *dope* or *oil* would keep the journals *cool*, have been lubricated with *nothing but water*, and run *cold* and *smooth*, as long as water was used, and when repacked with oil they would get hot. Many times has this been done, and will be again for any railroad company that desires to see it. Parties interested can address the inventor, R. C. Morris, Olney, Ill.

The Ball Engine and Governor.

THE principle of the Ball Engine and Governor is that the resistance of the load is used as one of the governing forces. It has been widely discussed and generally approved. We give herewith three cuts illustrating the engine and governor and its peculiarities. The description is adapted from an able article in *Mechanics*.

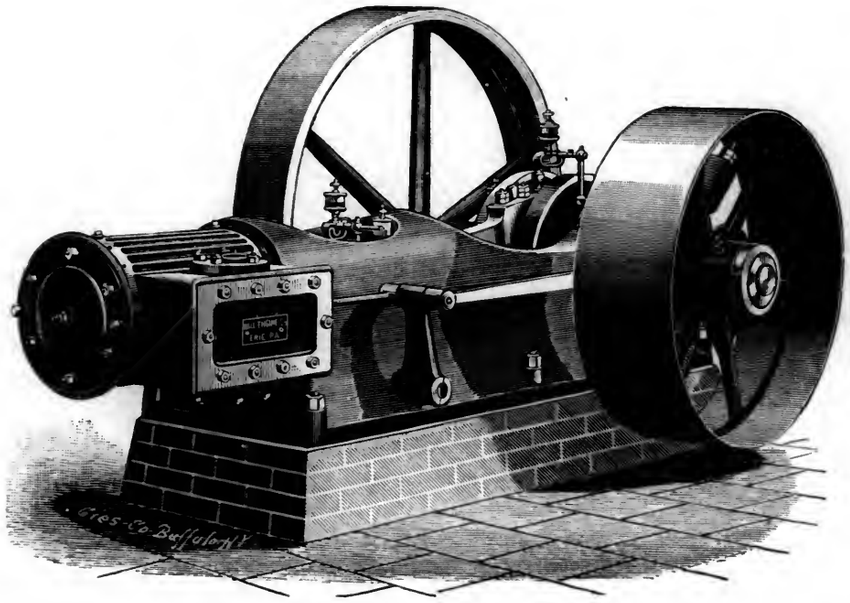


FIG. 1.—THE BALL ENGINE AND GOVERNOR.

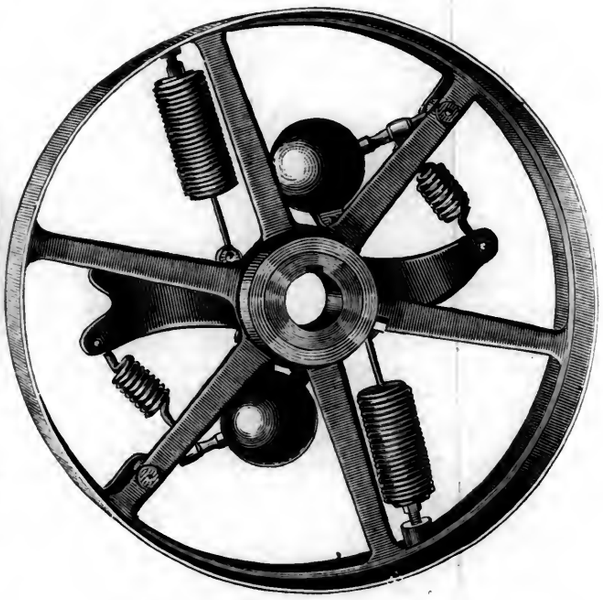


FIG. 2.—GOVERNOR WITH THE ECCENTRIC DETATCHED.

The reader will observe in Fig. 1 that the form for the frame is exceedingly rigid. The frame is bored longitudinally to receive the guides, which are of the locomotive type and are fitted into the bore of the frame, thus securing perfect alignment. The cranks are of the disk pattern and counterbalanced, the wearing surfaces unusually ample, and the engine throughout constructed in a very solid manner, in order to adapt it to high speeds, heavy duty, or both. The ability of the governor to maintain an absolutely uniform speed of rotation under the widest variation of load seems to justify the claim that as an electric-light engine it will stand very high. The very wide scope of the goveror action deserves especial attention in connection with electric lighting. The governor is capable of increasing the speed as the load increases, and of falling off as the load diminishes. Such a regulation as this when separate engines are used for each dynamo is very valuable. When so arranged the engine runs up to standard speed only when the full number of lights are in use, and as lights are turned out the engine slows down instead of accelerating its speed, as is commonly the case. The advantage of being able to do this are too apparent to need enumerating. This result, we believe, has never before been attempted. With all the forms of steam-engine governor heretofore known, a slight falling off of speed as load is added cannot, in the nature of things, be avoided, and to reduce this to a minimum has been the aim of engine builders. The introduction of the load itself as a factor in controlling the speed makes it possible either to obtain a perfect uniformity or to obtain an acceleration under an increasing load.

Fig. 2 shows the governor, pulley, balls, springs, arms, etc., but with the eccentrics detached. These, however, are shown in Fig. 3. The construction is considerably changed from the original design. In Fig. 2 the driving pulley is mounted on the hub of a fixed arm, and covers the weights and springs. The centrifugal force of the weights is opposed by the larger springs, and the connection with the end of the fixed arm makes the effort of the engine also oppose the centrifugal force, It will be seen from this that the position of the weights at any given speed is the result of the combined force of the large springs and the effort of the engine. In this way the governor is adjusted to constantly weigh the work being done, and when the large springs hold the weights in position to give the required speed to the empty engine, the resistance of the load draws them in just the necessary distance to maintain the speed desired. Fig. 3 shows the eccentric and the mechanism which connect the governor weights to the eccentric. A is the connect and B an arm attached to its side, the outer end of which is pivoted to the fixed arm of the governor, thus allowing a swinging motion of the eccentric equal to the length of the elongated shaft opening in eccentric. C is a disk having a flange D, eccentric to the shaft. E is a ring fitted inside this flange and carrying the stud F, which stud engages the eccentric A. It will be seen that the rotating of disk C causes the swinging or "pendulum" motion of eccentric A, by which governing is effected. G is a flanged collar

screwed to a sleeve projecting from the disk C. Its office is to hold eccentric in contact with disk C. The rotating of this disk is caused by links connecting it with the governor weights. The peculiar manner of controlling the

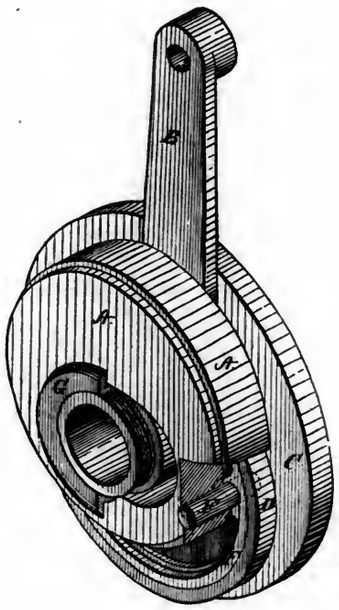


FIG. 3.—THE ECCENTRIC.

eccentric with another eccentric enables the governor to drive successfully an unbalanced valve, which is a very desirable feature.

We may add to this description that the Ball Engine Company, Erie, Pennsylvania, have published an illustrated circular and price list, giving much useful information about their cut-off engine, "embodying a new system, in which the governor weights the load."

A FIRELESS LOCOMOTIVE, the invention of Mr. Honigmann, is creating considerable interest on the continent of Europe. When its boiler has been charged the engine is ready for use, and works like any ordinary engine; but after the steam has performed its ordinary duty in the cylinder, it supplies, by becoming condensed, the heat which produces a fresh portion of steam, and the more quickly the piston works the more force will be liberated. The engine thus appears to be its own source of power. The limit of action, from want of coal in the ordinary case, here sets in with want of strong caustic soda, which by the continuous absorption of steam finally becomes too diluted. When the engine has thus exhausted itself, both the water and the soda solution have to be drawn off, the soda to be concentrated again by evaporation, the boiler to be refilled with water of the required temperature.

"WHAT a wonderful age of invention it is," said Mrs. Peterson; "I see they are now making wire cloth, and I'll have some this very week to put a seat in Johnny's every-day pants."

RAILROAD FOR CAPE BRETON.—A local paper reports a large and enthusiastic meeting held in Sydney, lately, to consider the question of securing railway facilities for the island of Cape Breton. A number of stirring speeches were made, in which the opinion was expressed that the commercial and mining interests of the island demand imperatively that a railway be built at the earliest possible moment. United action was strongly urged, and a determination expressed to permit neither party feelings nor local jealousies to stand in the way of accomplishing the desired object. It was unanimously resolved to address petitions to both the local and the Dominion governments on the subject, and to circulate them throughout the four counties of the island, asking the people to sign them as largely as possible. Committees were appointed to carry out the resolutions.

ON THE PENNSYLVANIA RAILROAD.—In summer and autumn the east-going track of this line (the Pennsylvania Railroad) is covered with a low green growth, while the west-going track shows only the cracked stone of the "ballast." The reason of this is that trains from the West drop stray grains of wheat all along, which spring up among the stones. Birds from the neighboring woods make this granary a feeding ground, and even wild turkeys have been seen there snatching a hasty meal between two trains. Could there be a prettier piece of unconscious poetry than this in the midst of prosaic trafficking? Some of the poorer dwellers along the route emulate the birds by collecting coal that drops from the freight cars like the grain, and many get their whole fuel supply from these crumbs of the rich man's table. Sitting on the cool verandas of the Mountain House at Cresson, of a July dusk, the tourist or the resting man of business sees a line of a hundred cars, with the tawny flare of locomotive fires at either end, carrying toward the sea the food of nations; or hears, perhaps, like the sound of a population on the march, the low, heavy rumble of wheels that are bearing immigrants to their still uncreated homes. He listens, in fine, to one of the pulse-beats of the world.—*Harper's.*

PETROLEUM wells exist in India which are said to have been flowing for thousands of years. Doubtless the business of gathering the oil to serve some simple uses in its crude state is as old as civilization. Talking one day about the first discoveries of oil with a "wild-catter," on one of the narrow-gauge railway lines, that run over the mountains and through the forests to reach the wells of Warren and McKean counties, the man said: "Why, the oil business is no new thing. It's as old as the scriptures. Job was an oil man. He struck the rock, and it poured forth rivers of oil. He got rich in the oil business." "Yes," chimed in a stranger on the other side of the car, 'and that's the way he got his boils. I know men who can't be about oil wells without getting boils. They breathe in the carbon, and it goes into their blood." The "wild-catter" agreed with this theory, and added "that he had no doubt Job's wells took fire, burned up his children, and reduced him to poverty."—*The Century Magazine.*

THE WESTINGHOUSE BRAKE.—An English exchange notices a recent remarkable proof of the value of the Westinghouse brake. It says: "We may mention an incident which occurred recently, where the quick action of the Westinghouse brake certainly saved a serious collision

at New Cross, on the London, Brighton, and South Coast Railway. The signalman having allowed a light engine to pass his cabin, forgot that it was still standing on the main line, and lowered the signals for a heavy excursion train which was approaching. A curve in the line prevented the driver seeing the obstruction, but fortunately the yard foreman observing the danger, rushed towards the advancing train, and attracted the driver's attention. The latter at once applied the Westinghouse brake, and the train conveying nearly five hundred passengers was brought to a stand within three yards of the buffers of the light engine."

THE FASTEST RAILWAY TRAIN.—The fastest train in the world is the "Flying Dutchman" in England, which carries the mail 118 miles in two hours, or 59⅛ miles per hour. Germany comes second with a train running 51 7-10 miles per hour. In America the Canada-Atlantic takes the lead with a train making fifty miles per hour. Allowing but two minutes for each stop on the Canada-Atlantic, the rate of speed on its fast train would be surpassed by but one train in the world, the Flying Dutchman. The fastest train in the United States is on the Pennsylvania Railroad, and runs from Jersey City to Philadelphia—90 miles—in one hour and 52 minutes, the average speed being 48 3-10 miles per hour. The Boston and Providence run the fastest train in New England—44 7-10 miles per hour.

A WORD of caution is necessary about the ink pencils which have come so much into vogue lately. A most useful implement to the business man, this innocent looking pencil can be easily converted into a treacherous friend, and on no consideration should be used to write signatures. The composition of the pencil is a peculiar combination, highly poisonous in itself—and herein lies the danger to signature writers—competent to give off two or more impressions on damped paper—not tissue paper, be it understood, but ordinary writing paper. Attention was first directed to the peculiarity by an official of the Bank of New Zealand, and experiments proved the easy practicability of making a clear copy of the filling in of a cheque with this ink pencil. First the writing of the cheque is transferred, upside down, of course, to a slip of damped paper, and from that transferred, right side up, to another slip of damped paper. We tested this recently in the case of a cheque written with the ink pencil, and sent in from the country, and by simple hand pressure obtained a very perfect copy of the transferable parts of the document,—*Paper and Printing Trades Journal.*

TO CLEAN BRASS AND COPPER.—Somebody says large articles of brass and copper which have become very much soiled may be cleaned by a mixture of rotten-stone (or any sharp polishing powder) with a strong solution of oxalic acid. After being thoroughly cleaned, the metal should be wiped off with a cloth moistened with soda or potash, and a very light coating of oil should be applied to prevent the further corroding action of the acid. A more powerful cleaning agent, because very corrosive, is finely powdered bichromate of potash mixed with twice its bulk of strong sulphuric acid, diluted (after standing an hour or so) with an equal bulk of water. This will instantly clean the dirtiest brass, but great care must be taken in handling the liquid, as it is very corrosive. Brass which has been lacquered should never be cleaned with polishing powders or corrosive chemicals. Wiping with a soft cloth is sufficient, and in some cases washing with weak soap and water may be admissible. Dry the articles thoroughly, taking care not to scratch them, and if after this they show much sign of wear or corrosion, send them to the lacquerer to be refinished.—*Building.*

Sugar as an Article of Diet.

DUTROME calls sugar the "most perfect alimentary substance in Nature." Dr. Rush says sugar affords the greatest quantity of nourishment in a given quantity of matter of any substance in nature. Sir John Pringle tells us that the plague has never been known to visit any country where sugar composed a material part of the diet of the inhabitants. Dr. Cullen is of the opinion that the frequency of malignant fevers of all kinds has been lessened by the use of sugar. The celebrated Trouchina recommended sweetened water for almost every malady. Dr. Frothergill was very anxious that the price of sugar should be so far reduced as to make it accessible to the common people. Dr. Franklin had taken large quantities of blackberry jam for relief from pain of the stone, but discovered at length that the sanitary property resided wholly in the sugar. Sugar has been found to be an antidote to the poison of verdigris, if taken speedily and in abundance. It has been said that sugar injures the teeth, but this opinion does not deserve a serious reflection. The plentiful use of sugar is one of the best preventives of intestinal diseases in children. Nature seems to have implanted a love for this aliment in young people, as if it were on purpose to defend them from such disorders.

Absorbing the National Wealth.

A SYNDICATE of European and American capitalists, in which is Lord Rosebury, is said to be buying up the coal lands in the Connellsville coke regions, so as to control the manufacture. Coke is of growing importance in the smelting of iron as well as the more precious metals, and something of its value may be guessed by the shipment of coke from these fields east of Pittsburgh as far west as Salt Lake, and by sea to Arizona and Idaho. There is some coking coal found in southern Colorado. The next most important deposit is in West Virginia along and near the Chesapeake and Ohio Railroad, and in Eastern Kentucky, so that it will be some time before all the coke falls into the hands of one set of men.

At the same time we hear of syndicates in anthracite coal lands, syndicates in oil lands, syndicates in pine timber lands, syndicates in grazing lands, syndicates in quicksilver, nickel, and in whiskey, native wines and wheat, in which more or less foreign capital takes part. We are on the eve of some mammoth speculations in this country, the like of which have never been seen in the world before.

ADVERTISE in the AMERICAN RAILROAD JOURNAL.

Maidenhood.

Maiden! with the meek, brown eyes,
In whose orbs a shadow lies,
Like the dust in evening skies!

Thou whose locks outshine the sun,
Golden tresses wreathed in one,
As the braided streamlets run!

Standing, with reluctant feet,
Where the brook and river meet,
Womanhood and childhood fleet!

Gazing, with a timid glance,
On the brooklet's swift advance,
On the river's broad expanse!

Deep and still that gliding stream
Beautiful to thee must seem
As the river of a dream.

Then why pause with indecision,
When bright angels in thy vision,
Beckon thee to fields Elysian?

Seest thou shadows sailing by,
As the dove, with startled eye,
Sees the falcon's shadow fly?

Hear'st thou voices on the shore
That our ears perceive no more,
Deafened by the cataract's roar?

O thou child of many prayers!
Life hath quicksands—life hath snares;
Care and age come unawares!

Like the swell of some sweet tune,
Morning rises into noon,
May glides onward into June!

Childhood is the bough where slumbered
Bird and blossoms many numbered;—
Age, that bough with snows encumbered.

Gather then each flower that grows,
When the young heart overflows,
To embalm that tent of snows.

Bear a lily in thy hand;
Gates of brass cannot withstand
One touch of that magic wand.

Bear, through sorrow, wrong and ruth,
In thy heart the dew of youth,
On thy lips the smile of truth.

O that dew like balm shall steal
Into wounds that cannot heal,
E'en as sleep our eyes doth seal.

And that smile, like sunshine, dart
Into many a sunless heart,
For a smile of God thou art.

HENRY W. LONGFELLOW.

Air and Exercise.

SOME DIRECTIONS GONDUCIVE TO GOOD HEALTH AND LONGEVITY.

THE summer air of the highlands makes out-door life a luxury, but the chief advantage of the plan is this: The stimulus of a pleasant pastime enables a man to beguile himself into about ten times as much exercise as he could stand in the Turner hall. The visitors of a hygienic gymnasium take their turn at the horizontal bar as they would swallow the drug of a public dispensary; they know that it is a lesser evil, they know that the road to Styx is the alternative, they intend to come every day, but the intolerable tedium of the crank-work exercise soon shakes that resolution. The motive for exertion is too abstract; it lacks the charm of progressiveness and the stimulus of a proximate, tangible and visible purpose. The sham competition of a regiment of invalids under the command of a turn-master does not much sweeten the bitter broth; it is still crank-work, minus the club of the jailer, and nine out of ten hygienic gymnasts will soon find or make a pretext for discontinuing their visits. How many out of a hundred pupils of a young ladies' seminary would dream of performing their "calisthenics" at home! They would as soon walk on all-fours, or ride on a dry clothesline. But arrange a May-day picnic in the mountains, and they will beat a kid in climbing the steepest rocks, and swing on wild grape-vines for hours together.

It is likewise certain that fatigue can be far better borne if the body is not encumbered with a surplus of calorific clothes. A pair of linen trousers, a flannel hunting shirt and a loose necktie make the most hygienic summer dress. In the afternoon remove the necktie and roll up the shirt sleeves; it can do no harm to imbibe fresh air by all available means, and let the cutaneous lungs share in the luxury. Nor is there any excuse for the widespread fallacy that it is dangerous, even in the most sweltering nights, to remove the bed blankets. Kick them into the farthest corner if they become too warm, and sleep in your shirt and drawers, or under a linen bed sheet. Half-naked lazzaroni sleep the year round on the stone terrace of the Museo Borbonico and outlive the asthmatic burghers in their sweat-box dormitories. The body effects part of its breathing through the pores. Painting a man with yellow ochre and copal varnish would kill him as surely as hanging him by the neck. The confined air between the skin of the body and a stratum of heavy blankets gets gradually surcharged with carbonic acid—in warm weather even to the verge of the saturation point. The perspiration is thus forced back upon the body; and the lungs—perhaps already weakened by disease—have to do double work.—*Popular Science Monthly.*

Tar, Rosin and Turpentine.

ALL of the substances named above are obtained from the more resinous trees of the pine family. Tar, the first named, for example, is obtained by distilling in rude apparatus the heart-wood of the pine. It forms a brownish-red substance, which becomes black with age, or when overheated in the process of manufacture. It is viscous and semi-fluid at ordinary temperature, solid when cold, and becomes quite a thin fluid when heated. Pitch is obtained by boiling tar until its consistency has become considerably increased, in which condition it is hard at ordinary temperatures, but becomes soft by the heat of the hand, and liquid on heating. Turpentine is the sap of the pine, which is obtained by tapping the trees at certain seasons when it flows most freely. The product yielded from the trees tapped for the first time is much whiter than that afterwards obtained, and is called white turpentine, or "virgin dip." The flow obtained after this for a succession of years is called "yellow dip." Trees stand this tapping for twelve or fifteen years in succession. By distilling this turpentine, or "gum turpentine," as it is properly called, with water, it yields two products, spirits of turpentine (which distils over with the water) and rosin, which remains behind in the still, and is afterwards run off and collected separately. The "virgin dip" yields a larger proportion of spirits of turpentine—about six gallons to

the barrel—than the "yellow dip," which yields about four gallons to the barrel. The "virgin dip" is therefore the more valuable of the two, both because it yields a higher percentage of the valuable spirits of turpentine on distillation, and because the resulting rosin is lighter in color. These industries are chiefly carried on in North Carolina, United States.

Hotels in India.

HOTELS in India are worth noticing. The first with which I made acquaintance was at Vixgapatam, kept by one Baboo Krishna Ghosal Bhat. Something like a Pompeian house, composed of pillars, half-roofs, peristyles, atrium, etc., furnished with punkahs and kus-kus tatties (that is, mats made of fragrant fibre, hung against open windows and doors; in the hot winds they are wetted, and the draught blows through them cool and refreshing). There was no furniture to speak of, save two lame tables, three bottomless chairs, and plenty of dirty whitewash and cobwebs, relieved by some colored German prints, such as are purchasable at the Nuremburg fairs for a few kreuzers apiece. "Pegs"—that is, brandy and soda water—were procurable and drinkable; but eating was out of the question, everything was so abominably filthy. I was rescued from starvation by a friend who lived some three miles distant—at Waltair—or I should have perished from hunger or nausea. In traveling up country in India, people always take their servants to cook for them, unless they can depend upon the hospitality of a friend. They also take bedding with them, which is arranged on a horizontal harp, supported by four legs, called a "charpoy." This last precaution is very necessary, as a charpoy *au naturel*, as used by the natives, would not be considered comfortable by Europeans, who prefer mattresses to knotted cords, which, to say the least, are calculated to impress a pattern on the flesh of whoever reposes thereon. The worst feature of Indian hotels, however, is that of the inner-man administration. It is impossible to give an idea of the monotony of the bills of fare. Every dish, whether boiled fish or roast joint, omelette or curry, chop or vegetable, tasted of and was pregnated with *ghee*, which is about the most disagreeable description of grease with which I am acquainted. It is worse than the bad oil in Wallachi. It would be vain for me to attempt to describe the distaste with which I approached the table, or the disgust with which I left.

Variations in the Use of Words.

IT will hardly be denied in any quarter that the speech of the United States is quite unlike that of Great Britain in the important particular that here we have no dialects. Trifling variations in pronunciation, and in the use of a few particular words, certainly exist. The Yankee "expects" or "calculates" while the Virginian "reckons;" the illiterate Northerner "claims," and the Southerner of similar class, by a very curious reversal of the blunder, "allows" what better educated people merely assert. The pails and pans of the world at large become "buckets" when taken to Kentucky. It is "evening" in Richmond while afternoon still lingers a hundred miles due north at Washington. Vessels go into "docks" on their arrival at Philadelphia, but into "slips" at Mobile; they are tied up to "wharves" at Boston, but to "piers" at Chicago. Distances are measured by "squares" in Baltimore, by "blocks" in Providence. The "shilling" of New York is the "levy" of Pennsylvania, the "bit" of San Francisco, the "ninepence" of old New England, and the "escalan" of New Orleans, But put all these variations together, with such others as more careful examination might reveal, and how far short they fall of representing anything like the real dialectic differences of speech that obtain, and always have obtained, not only between the three Kingdoms but even between the contiguous counties of England itself. It ought to be remembered also that the ordinary langnage of the United States includes not greatly more of what may be called caste variations, than of those that are attributable to differences of locality, The speech of the lower orders of the people, whether examined in regard to its vocabulary, its construction, or its pronunciation, differs from what all admit to be the standard correctness by a much smaller degree than is the case in England. A comparison of slang dictionaries will reveal a far longer list of unauthorized words as current among British "codgers" than among their congeners in the United States. Grammatical rules are violated badly enough by the ignorant of our own cities every day, no doubt; but how often, after all, will you hear from intelligent and respectable working people of American descent quite such a solecism as the "I were" and "he were" that one so frequently notices in the mouths of lower middle-class Britons, accustomed all their lives to conversation with speakers of the purest English? And as for the pronunciation, we have our faults, of course, in abundance; but where, from the Atlantic to the Pacific, will you discover any such utter disability of hearing or discernment as can permit men to drop or multiply their h's, or transpose their w's and y's. —*Prof. Tucker in North American Review.*

Eat Honey.

WHY CHILDREN SHOULD BE FED ON NATURE'S SWEET.

THOUSANDS and tens of thousands of children are dying all around us, who, because their ever-developing nature demands sweetness, crave and eagerly demolish the adulterated "candies" and "syrups" of modern times. If these could be fed on honey, instead they would develop and grow up into healthy men and women.

Children would rather eat bread and honey than bread and butter; one pound of honey will reach as far as two pounds of butter, and has, besides, the advantage that it is far more healthy and pleasant-tasted, and always remains good, while butter soon becomes rancid, and often produces cramp in the stomach, eructations, sourness, vomiting and diarrhea. Pure honey should always be freely used in every family. Honey eaten upon wheat bread is very beneficial to health.

The use of honey instead of sugar for almost every kind of cooking is as pleasant for the palate as it is healthy for the stomach. In preparing blackberry, raspberry, or strawberry short-cake, it is infinitely superior.

It is a common expression that honey is a luxury, having nothing to do with the life-giving principle. This is an error—honey is food in one of its most concentrated forms. True, it does not add so much to the growth of

muscle as does beef-steak, but it does impart other properties, no less necessary to health and vigorous physical and intellectual action. It gives warmth to the system, arouses nervous energy, and gives vigor to all the vital functions. To the laborer, it gives strength—to the business man, mental force. Its effects are not like ordinary stimulants, such as spirits, etc., but it produces a healthy action, the results of which are pleasing and permanent—a sweet disposition and a bright intellect.

How Tacks are Made.

THE iron is received from the rolling mills in sheets from three inches to twelve inches wide, and from three feet to nine feet in length, the thickness varying, according to the kind of work into which it is to be made, from one-eighth to one thirty-second of an inch. These sheets are all cut in about thirty-inch pieces, and by immersion in acid cleaned of the hard outside flinty scale. They are then chopped into strips of a width corresponding to the length of the nail or tack required. Supposing the tack to be cut is an eight-ounce carpet tack, the strip of iron, as chopped and ready for the machine, would be about eleven-sixteenths of an inch wide, and thirty inches long. This piece is placed firmly in the feeding apparatus, and by this arrangement carried between the knives of the machine. At each revolution of the balance wheel the knives cut off a small piece from the end of this plate. The piece cut off is pointed at one end, and square for forming the head at the other. It is then carried between two dies by the action of the knives, and these dies, coming together, form the body of the tack under the head. Enough of the iron projects beyond the face of the dies to form the head, and while held firmly by them a lever strikes this projecting piece into a round head. This, as we have said before, is all done during one revolution of the wheel, and the knives, as soon as the tack drops from the machine, are ready to cut off another piece. These machines are run at the rate of about 250 revolutions per minute. The shoe-nail machines, for cutting headless shoe-nails, are run at about 500 revolutions per minute, and cut from three to five nails at each revolution.—*Mechanical Engineer.*

The Value of Coal Tar.

IT is not longer than thirty years back, that coal tar was almost entirely valueless. In London it was sold at a half-penny per gallon, and that was considered a very good price for a product which, in most of the towns of England, was given away by the manufacturers of lighting gas for nothing, only to get rid of the "nuisance and incumbrance." Up to 1856 only small quantities of benzine, naphtha and creosote oils were distilled from it. In that year, the discovery of Perkin's aniline violet attracted the attention of the industrial and commercial world, and coal tar entered the list of regular articles of commerce; the demand for it increased rapidly, and with it the price rose proportionally. At present the color industry consumes the entire production of benzine, the greatest portion of the naphtha, all the anthracite and a part of the naphthaline which are produced from coal tar.

The value of coloring material annually produced in England alone, from coal tar, is estimated at 3,200,000 lb. Besides, there are produced over 1,000,000 tons of ammonia and 95,000 tons of sulphate of ammonia, worth more than £20 per ton. The value of these side-issues of the English gas-works is said to far exceed the value of the coal consumed by them, and which is estimated at 3,000,000 lb. annually. This profitable utilization of the waste-products is the reason why gas is so cheap. The so-called gas-works in England occupy themselves, in fact, mainly with the manufacture of coal tar, ammonia, etc., and therefore furnish the gas, as an incidental product, at a price only a little above the cost of making it.

The Cigar as a Social Force.

MAKE no mistake, a cigar is a great arbitrator. It helps break the ice, it bridges over the gulf of embarrassment in meeting unexpected or undesirable parties, it is a sort of passport to good-fellowship and kind treatment. It tides over that awkward first few minutes when you sit down to a business confab with strangers, or men that you are a little shy of; and it fills in the odd moments when you are waiting to see which way the cat will jump. By the attention which you must give your cigar you gain time for deliberation, and it somehow gives you an appearance of fortitude and composure which you don't feel in the least. Why, let two men light cigars and sit down to make a contract, and I'll guarantee they'll get five per cent. better terms on each side than if they nervously whistled and drummed on the table between spells.

So, in a business way, I think it is often an advantage to smoke. If I were a newspaper man I should learn that and short-hand the first thing.—*Lafayette (Ind.) Times.*

ONE of the severest losses inflicted by the burning of the exposition building at Pittsburgh on the morning of the 3d inst., was the destruction of the famous old locomotive exhibited by the Baltimore and Ohio railroad company at the recent national exposition of railway appliances, and known as the Arabian.

The Lake Shore and Michigan Southern Railway Co.

TREASURER'S OFFICE, GRAND CENTRAL DEPOT,
NEW-YORK, Sept. 26, 1883.

The Board of Directors of this Company have this day declared a QUARTERLY DIVIDEND of TWO PER CENT. upon its capital stock, payable on THURSDAY, the first day of NOVEMBER next, at this office.

The TRANSFER BOOKS will be closed at 3 o'clock P. M. on TUESDAY, the 2d day of OCTOBER next, and will be reopened on the morning of MONDAY, the 5th day of NOVEMBER next.

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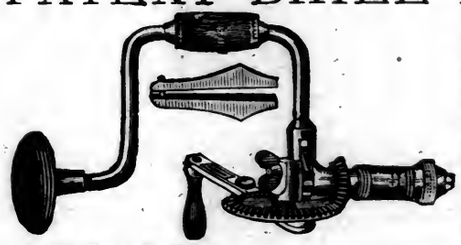
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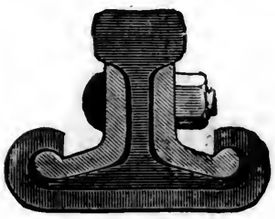
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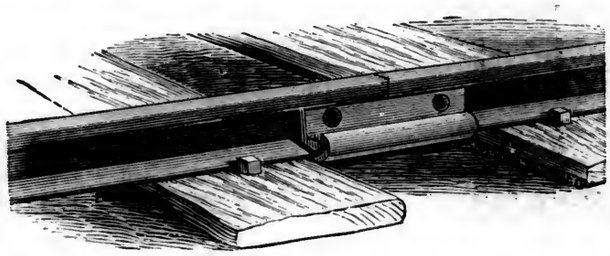
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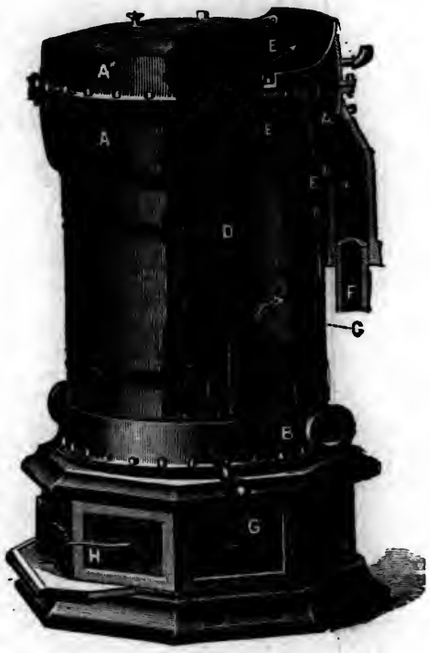
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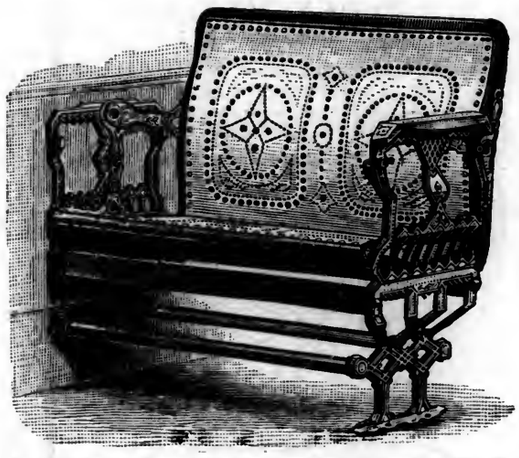
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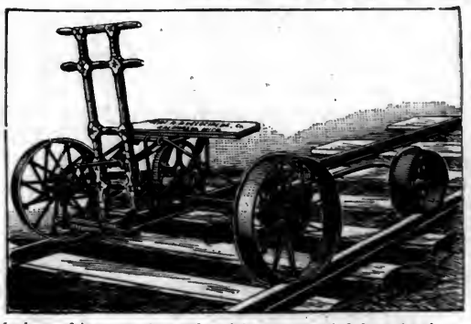
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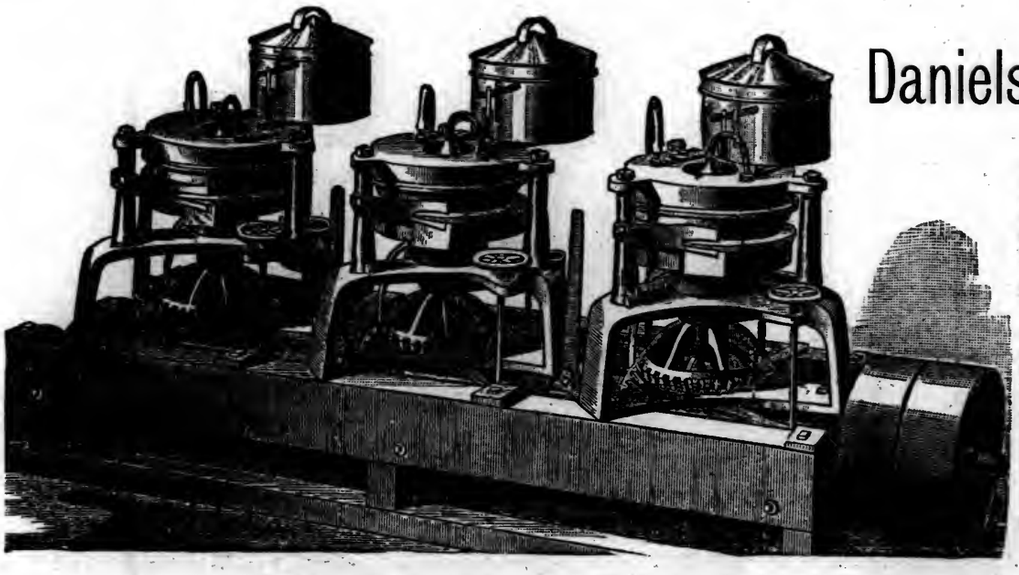
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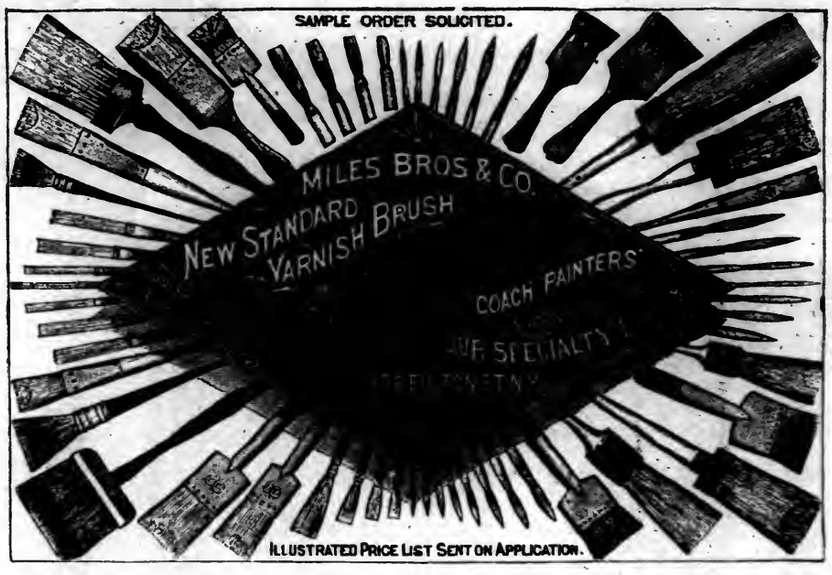
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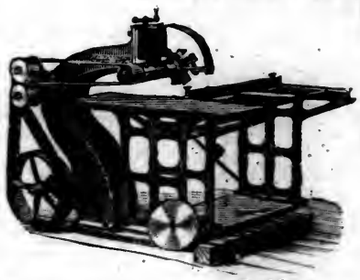
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I have obtained decree, with costs and damages, against all parties who imitate my **M** teeth which cut with the outside of the **M** only. The two points of each tooth are set upon one side and the next two points on the other side, equivalent to front cut of ordinary hand-saw tooth, both ways, one point alternate decreases cutting one-half, as do all imitations (which are still held liable by the United States Court), and new Company will now collect of dealers and users, as well as manufacturers, for infringements. An Illustrated Catalogue furnished free on application.

For One Dollar, a Pruning Saw, complete, with brass edge sheath, or a Buck Saw blade, will be mailed. Agents wanted, to whom special terms will be made, and who can do well. This Company also manufactures the **Noon-day Stove Polish,** so rapidly coming into favor.

AMERICAN Railroad Journal

·ESTABLISHED·1831·

Railroads, Tramways, Finance, New Inventions, Machinery.

WHOLE NO. 2,546.] NEW YORK, NOVEMBER, 1883. [VOLUME LVII.—No. 8.

Railroad Notes.

WE invite railroad officers to send us notice of elections, transfers, appointments, resignations, etc.; and all our readers would oblige us by furnishing us with any items of news which may come to their knowledge and are of a suitable nature for our columns. It is our intention to publish monthly full and accurate information regarding those enterprises and industries to which the AMERICAN RAILROAD JOURNAL is devoted, and to effect this end we solicit the coöperation of readers interested therein. We aim specially to record all new railway enterprises in the United States and Canada, and to note the progress of construction on all new roads and extensions; and we request those concerned in railway building to give us early information concerning the above, that our reports may be as complete as possible.

HANDS in several of the Pennsylvania Railroad Company's shops at Altoona have been ordered to work until 10 o'clock at night, owing to a press of orders.

BIDS for the construction of the roadway of the South Pennsylvania Railroad were handed in on the 15th inst., at Harrisburg. Beyond the statement that many of them are at least 30 per cent. lower than work of the same character has heretofore been done, nothing is known. There are about 200 bids.

ON November 1, arrangements were made by which the Adams and the Southern Express Companies will hereafter conduct the express business over all the lines controlled by the Shenandoah Valley and the Norfolk and Western Railroad Companies. The roads now operated by the Norfolk and Western between Norfolk, Va., and Bristol, Tenn., a distance of 408 miles, were the first to inaugurate what is known as the Railroad Express. This was directly after the close of the war.

THE laying of the track of the Williamstown Railroad extension from Williamstown to Grassboro, N. J., was completed on the 13th inst. The work of ballasting will begin at once, and the road put in a condition to receive trains before 1st of December.

THE eighth annual convention of Railroad Passenger and Freight Conductors' Mutual Aid and Beneficial Association, was held at Chicago on the 14th inst. The receipts of the association during the past year were $40,000, and the disbursements on account of deaths and disabilities, $45,000. The present membership numbers 1,467. Twenty-one deaths occurred during the year.

THE committee of the bondholders of the Danville, Olney and Ohio River Railway, which road has been in the hands of a receiver for some time, has just completed a tour of inspection over the line. The committee reports that the property is in good condition; that the management of Receiver Howard is commendable; that the deficit of earnings, as compared with operating expenses, is less than the committee expected to find, considering the condition of the property, and that the management of the past nine months is fully indorsed.—*Boston Daily Advertiser.*

MR. D. B. ROBINSON is to assume the position of general manager of the Mexican Central Railroad. His headquarters will be at the City of Mexico. Mr. Robinson is positive that the entire line will be completed by the 1st of April next, and that a large trade will be developed. He also stated that a short time ago four miles of track was laid on the Mexican Central road in ten hours.

THE Greeley (Col.) *Tribune*, in an article concerning the proposed railroad known as the United States Central Railroad, has the following as to the location of the road. The objects and purposes for which this company is formed and incorporated are to construct and operate a railroad from the city of Denver, across the State of Colorado, the Territory of Utah and the States of Nevada and California to the city of San Francisco, and also branch lines to Leadville, Colorado, Milford and the Iron Springs, in Utah; and also to Crystal Springs, Pahrangat valley, near Hyko, in the county of Lincoln, Nevada, via Stone's Ferry, on the Colorado River, to a junction with the Atlantic and Pacific Railroad in the Territory of Arizona, a distance of 160 miles; also from a point on the main line near Gilroy, in Santa Clara county, California, to the eastern side of San Francisco bay, Alameda county, in California, a distance of eighty miles. The estimated length of the line is 1,200 miles, with 300 miles of branches.

COMPARATIVE statement of earnings and expenses of the Rome, Watertown and Ogdensburg Railroad Company for September: 1883, receipts, $172,848.15; operating expenses, $94,844.08; net earnings, $78,004.07; 1882, receipts, $188,307.19; operating expenses, $114,629.42; net earnings, $73,677.77; increase in net earnings for 1883, $4,326.30.

THE pay-roll of the Pennsylvania Railroad Company's shops at Altoona amounted to $215,000 last month. The company has given orders for 1,000 gondola cars, to be used in the Clearfield coal region.

THE engineers of the Schuylkill Valley Railroad have reached Hamburg. It is believed that the trains over the new line will be running into Reading by the 1st of September, 1884.

THE two rail mills at Scranton have made 10,000 tons of steel rails for the New York, West Shore and Buffalo Railroad Company.

THE last gap in the track of the West Shore Road, between New York and Buffalo has been closed, and the line is now completed between these cities. The trains will be running between New York and Buffalo on December 15. The track is in fine condition between Syracuse and Buffalo.

THE St. Louis, Iron Mountain and Southern Railroad Company has asked the New York Stock Exchange to strike from the regular stock and bond list its entire issue of second preferred income bonds, amounting to $4,015,720. The said bonds have been retired, and the officers of the company state that steps are being taken to have the mortgage which was issued to secure them canceled.

THE Long Beach Railroad Company has completed the purchase of the Tuckerton Railroad, which runs from Tuckerton, about fifteen miles from Atlantic City, to Whitings. The terms of the purchase have not been made public. The road is a small one, and at present barely pays expenses. The Long Beach Railroad is a corporation under the control of the Pennsylvania Railroad, and is designed to run down the entire length of Long Beach from Barnegat City to Absecom. A branch will be built from Tuckerton to Absecom to connect with the Camden and Atlantic Railroad, thus furnishing direct communication to New York for all the cities on the New Jersey coast from Atlantic City north. It is intended that the road shall be completed and ready for service by the 1st of June next.

BOSTON, Nov. 13.—The annual report of the Boston and Lowell Railroad for 1883, shows that the gross earnings were $2,127,304, and the operating expenses $1,812,565, and the net revenue $248,178. The funded debt is $3,546,400, and the floating debt $765,000. Samuel L. Aldrich was elected president of the Central Massachusetts Railroad, and G. F. Seymour, secretary and treasurer.

E. G. ALLEN, superintendent of the Massachusetts Central Railroad, has been appointed general superintendent of the Ohio River Railroad, with headquarters at Parkersburg, West Va.

THE September statement of the Union Pacific Railroad Company shows that the gross earnings for the month were $2,994,076, a decrease from the corresponding month last year of $176,239; expenses, $1,535,188, an increase of $274,596; surplus earnings, $1,458,888, a decrease of $450,835. The decrease in the earnings was due primarily to the extension of the Chicago, Burlington and Quincy to Denver, and also to a decrease in Colorado business. The gross earnings for October show a decrease of $50,000. According to approximate figures, the earnings of the first week in November show an increase of more than $70,000 over those of the same week last year.

A SYNDICATE of railway capitalists at Baltimore has bought the franchise and property of the Washington City, Cincinnati and St. Louis Railroad Company. The project is to build a road from Linwood, Va., a point on the Shenandoah Valley road, to Harrisonburg, and thence westward about one hundred miles, through the Dora coal mines in Pocahontas and Webster counties.

IT is probable that the opening of the New Orleans and Mississippi Valley Railroad will be postponed until about the 1st of December, as the Jackson press property will have to be turned into freight sheds, etc., before the road is ready to handle traffic. Aside from this, no depots have as yet been erected along the line between New Orleans and Baton Rouge and no platforms at the flag stations.—*Times-Democrat.*

AS THE efforts of the Illinois Central Railroad to purchase the Mississippi and Tennessee road did not succeed, it is now stated that the Illinois Central will build a line from Memphis to Jackson, Tenn., at an early day, as such a road is something which the Illinois Central system has long needed.

SHAWANO County, Wis., has granted one year's extension to the St. Paul Eastern Grand Trunk Railway Company, for completing its line through the county. The extension involves the right to about 100,000 acres of land, given in aid of the road, nearly all of which is now in the hands of New York capitalists.

THE Georgia Pacific Railroad was completed to Birmingham on the 12th inst., and regular trains between that place and Atlanta will be at once put on the road.

THE Philadelphia and Reading Railroad has contributed $5,000 for the relief of the sufferers by the Shenandoah fire, and will transport all supplies to that place free of cost.

IT is officially announced that the negotiations for the Canadian Pacific Railway guarantee have been completed at Ottawa, and that the agreement has been duly executed.

THE Delaware, Lackawanna and Western Railroad has decided to extend its coal business, and will soon begin work on some immense coal-bunkers to be built at South Chicago. The company propose to establish a line of large steam barges, to be run from Buffalo to Chicago, thus securing to the company an entire line of transportation from the coal fields to the West.

THE earnings of the St. Louis and San Francisco Railway for the first week of November, were $87,000; in 1882, $77,700; increase, $9,300; since January 1, $3,170,300; in 1882, $2,928,700; increase, $181,600.

THE record of railway construction for the week ending Nov. 10, aggregated 91 miles, a total for 1883, thus far, of 5,279, against 8,731 in 1882.

SAN ANTONIO, Nov. 13.—It is reported that Col. Huntington will stop work on the Sunset Mexican extension on the completion of the 250th kilometer, which will be about Jan. 1. The men will then be brought over to complete the work in Texas.

TROY, N. Y., Nov. 14.—A citizens' meeting was held at Ticonderoga, Essex county, on Nov. 14, to consider the proposed extension of the Vermont Central Railroad across Lake Champlain to Ticonderoga. A committee was appointed to confer with the directors. The prospects are favorable to the extension.

THE annual meeting of the stockholders of the Valley Railroad was held at Staunton, Va., on the 15th inst. Samuel Spencer was reëlected president, together with the old board of directors. The reports received showed a very encouraging prospect for the road. The completion of the line to Lexington has opened up a fine business, and the question of further extension will soon be agitated. It is designed eventually to make this a grand trunk line to the South, and the proposed route penetrates a country rich in minerals and timber, assuring a large local traffic.

THE Ridgeway and Clearfield Railroad, extending from Ridgeway, on the Philadelphia and Erie Railroad, to Brockwayville in the heart of the coal fields, now operated by the New York, Lake Erie and Western Railroad Company, a distance of nineteen and a half miles, was opened for business on Nov. 19, and will be operated as part of the Middle Division of the Philadelphia and Erie Railroad. When completed the road will be twenty-seven miles long, and will reach a point on the low grade division of the Allegheny Valley Railroad.

THE annual meeting of the stockholders of the Rochester and Pittsburgh Railroad Company was held in New York on the 14th inst., and the following board of directors was chosen: Henry Day, Augustus Kountze, Andrew Pierce, A. L. Hopkins, Frederick D. Tappen, Frederick A. Brown, Wheeler H. Peckham, George W. Parsons, George D. Morgan, Walston H. Brown, John H. Hall, Adrian Iselin, Jr., and George F. Stone. A report of the condition of the road, financial and otherwise, was made by the president, Walston H. Brown. The gross earnings last year were $543,639.86, and the operating expenses $422,032.27, leaving net earnings of $121,607.59. These figures were based on the operation of 125 miles of road. The following charges against the net earnings were reported: Interest on bonds, $87,900; interest on car trust, $11,643.29; interest on Perry bonds, $1,400; interest on balances, $10,155.01; paid on account of Rasselas accident, $40,000; taxes, insurance, etc., $21,000.86; total, $172,099.16; showing a deficit of $50,491.57. President Brown recommended the purchase of some additional rolling stock.

IT is rumored that the Grand Trunk proposes to move for a lease of the Fitchburg and the Hoosac Tunnel and Western lines, in order to secure another line to Boston, in connection with the new West Shore Road, a lease of which, it is believed, has been virtually arranged, thus securing an independent line from Chicago to New York. A conference of directors of the Grand Trunk and Boston and Lowell was had on the 14th inst., in Boston, to consider the informal proposition of the former to lease the latter. The matter was discussed at length, but no agreement for a lease was reached, nor was any formal proposition for one accepted. The Central Vermont is supposed to be interested with the Grand Trunk in the proposed lease.

THE annual report of the New York, New Haven and Hartford Railroad Company shows a total income last year of $6,729,374; total expenses, $4,705,346; net income, $2,024,028; surplus for the year, $33,188; passengers carried, 7,079,168; tons of freight carried, 2,160,023; total cash assets, $4,019,868; total debt, $2,566,323.

Interesting Tests of Brakes.

FOLLOWING is a careful and complete record of tests recently made, of the brakes manufactured by the American Brake Company, of St. Louis. They were made at the request and under the supervision of Mr. S. W. Robinson, professor of mechanical engineering, Ohio State University, upon the White River branch of the St. Louis and San Francisco Railway, between Springfield and Galloway, on Monday, October 29, 1883.

FIRST TEST. TRAIN EMPTY.

Engine and tender, equipped with our steam driver and tender brakes.
Twelve coal cars, equipped with our improved automatic brakes.
One caboose, equipped.
Total weight of train, 164 tons. Length, 429 feet.

Number stops.	Speed in miles per hour.	Time in seconds.	Distance in feet.	Grade in feet per mile.
1	23	35	612	26 Down.
2	20	32	503	52.8 Down.
3	23	47	1090	79.2 Down.
4	26	41	1108	79.2 Down.
5	24	29	758	*a*31.7 Down.
6	23	27	552	26.4 Down.
7	24	23	468	26.4 Down.
8	18	21	475	*b*52.8 Down.
9	19¾	15	175	*b*13 Down.
10	25	50	1050	*c*42.2 Down.
11	24	20	380	*d*52.8 Down.

a After stop, locking pawls were adjusted.
b Backing and allowing momentum to apply brakes.
c Backing. Time and distance taken from moment engineer first shut off steam and includes all operations of the stop. (See note below.)
d Engine detached at speed. Hand-brake set on three forward cars. Time taken when pin was pulled.

NOTE.—In making a backing stop, when the desired speed is attained, the engineer shuts off steam and applies steam driver brake to draw the "slack" out of the train, then releases the steam brake, and allows the momentum to apply the automatic brake.

	Speed.	Time.	Feet.	Grade.
Average of all stops	22¾	31	652	44
Average of ordinary forward stops	23⅓	38	727	46

SECOND TEST. TRAIN PARTLY LOADED.

Engine and tender.
Twelve empty coal cars, equipped with automatics.
Three loaded coal cars, not equipped with automatics.
Two loaded box cars, not equipped with automatics.
One caboose, not equipped with automatics
Total weight of train, 281¼ tons. Total length, 585 feet.
(Loaded cars were interposed with empty cars.)

Number stops.	Speed in miles per hour.	Time in seconds.	Distance in feet.	Grade in feet per mile.
1	16	30	394	43 Down.
2	28	30	437	52.8 Down.
3	22½	35	408	37 Down.

	Speed.	Time.	Feet.	Grade.
Average	22	32	413	44

Speed taken from speed recorder.
Distances measured.
Grade taken from chief engineer's survey and profile.

Monthly Railroad Returns.

[All the companies are invited to send us a copy of each monthly report of earnings, etc., for insertion under this head.]

CHESAPEAKE AND OHIO.—Estimated gross earnings, month of October, 1883, $362,766.96; October, 1882, $351,309.96; increase, $11,457.00. Earnings, January 1 to October 31, 1883, $3,242,053.50; same months, 1882, $2,780,889.05; increase, $461,164.45.

ELIZABETHTOWN, LEXINGTON AND BIG SANDY.—Estimated gross earnings, October, 1883, $68,090.65; October, 1882, $58,288.81; increase, $9,801.84. Earnings, January 1 to October 31, 1883, $600,917.33; same months, 1882, $421,040.17; increase, $179,877.16.

NEW YORK AND NEW ENGLAND.—Estimated total receipts, October, 1883, $346,239.99; October, 1882, $297,030.15; increase, $49,209.84

ILLINOIS CENTRAL.—Estimated earnings, traffic department, October, 1883, $1,397,422; October, 1882, $1,311,678.79; 1,516 07-100 acres sold during the month for $7,149.44; collections during the month, $11,035.79.

MRS. JOHN W. GARRETT, wife of the president of the Baltimore and Ohio Railroad Company, died on the 15th inst., at Montebello (Mr. Garrett's country seat), near Baltimore, from injuries received October 11.

AMERICAN Railroad Journal

·ESTABLISHED·1831·

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ENGLISH AND AMERICAN CARS.

LIKE all other good things, a commendable pride in our nation and its institutions is open to abuse, and unquestionably there is a great deal of truth in what a correspondent writes us as to the prejudice and unfairness of many American critics on the British railroad system, in some of its features. His communication is too long for insertion in these columns, but a brief review of certain of his observations may be found both interesting and of service. He reflects with considerable spirit and some indignation, on those observations in American newspapers, which surely follow the account of an assault or murder in an English railway carriage, such remarks. so he alleges, invariably taking the form of a comparison intended to show the amazing superiority of our compartmentless car over the usual build of the British carriage, and a lecture to our cousins across the water, scolding them because, forsooth! they do not hasten to admit this assumed superiority. Moreover, he is quite unwilling to admit that a monopoly of practical good sense is owned by the railroad men of the American continent, and takes the position that, the differing conditions of travel being regarded, the British coach is preferable to ours for use in a thickly populated country, like England; while our car may be the best for use here. He claims simply that British railway companies are just as likely to know what is proper in the matter of carriage construction suitable for their country people, and the conditions of the national life, and to provide it, as American companies to make their preference of the manner in which cars are shaped for the accommodation of the American public. This broad principle is so reasonable, that we think no reader of reflection will be found to gainsay it; and as the policy of the AMERICAN RAILROAD JOURNAL is and always has been liberal and widely representative, we have no objection, but rather find pleasure, in giving prominence to a position or two which our British critic on critics pleases to send us.

He asserts that in England, where trains must necessarily let off and take on passengers at distances which are always short as compared with those on American roads, the compartment system, with its many doors opening level with the station platform, is simply the best device practicable for the rapid discharge and reception of persons traveling; and that our plan of compelling exit and ingress by the front and back of the car and down a staircase to the roadway would, if generally followed in England, greatly impair the undoubted efficiency of the service as to rapid time, particularly when stops at short distances are made. Moreover, this presumptuous Britisher goes so far as to prophesy that the time may come in the history of American railway development, when to follow the English compartment plan will become

a necessity even here. This is turning the tables on us with a vengeance, modified, it is true, in some degree by the presumption that our population may become as dense as that of the "old country." Then our correspondent claims also, that the average English railway carriage, instead of giving less freedom to the passenger than the average American car, actually gives more, for the cramped position enforced upon the unfortunate victim of the two-to-a-seat arrangement of this, is vastly a more uncomfortable restraint than can possibly be imposed on the passenger in the fullest English train, in which even the cheapest seats conform as to shape, to the human form divine, are upholstered; and never necessitate uncomfortable crowding. Attempting the facetious, our redoubtable Briton traces the invention of the American "duster" to the form of our cars which, he says, is the best possible provision for filling them with dust and soot, while the happy English traveler escapes this infliction, or nearly so, by the provision of side doors to the coaches. Besides, he thinks the outrages occasionally committed on British railways by a ruffian alone with an inoffensive passenger in a compartment of a train, are more than set off by what he reads of railroad robberies in the West, where a gang of well-armed highwaymen "go through" a whole train, taking all the money and valuables in it, and murdering whoever withstands their rapacious will. They would not find it practicable to deal so with a train of carriages with compartments.

In short, our critic puts his points so well and forcibly, as to suggest the reflection, that the assurance of American journalism may not be beyond the possibility of erring in opinion from want of information, and from a narrow and self-conceited preference for things American, simply because they are American.

THE news columns contain an article entitled "A Railway Mission Car," which will be read with interest. Whatever the individual religious opinions of readers, they are surely at one in the encouragement of what promises to secure the moral improvement of men, by whatever means. Believing this firmly, we do not hesitate to announce in this conspicuous place, that the promoters of the mission car scheme will receive a certificate of incorporation from the Commonwealth of Massachusetts, as soon as arrangements necessary for this purpose have been made.

MR. WM. FALLON, of Newburgh, New York, has invented a new dump car, a model of which has been recently on view at this office. It can be used as either a flat or grain car. The inventor has great faith in his improvement, which we think to be sufficiently interesting to railroad men to justify this special mention and the promise that our next number shall contain an illustrated article describing it.

Our Railways and our Industries.

OUR country has reached one of those stages of development where it is necessary to stand still and await the arrival of the developing forces which underlie industrial and commercial activity. On all sides there are indications of over production. On every hand, merchants and manufactures are on the alert for wider and more abundant markets. Railway builders are impatient at the seeming completion of railway construction. Capitalists and investors find the avenues and opportunities for investment less numerous, and less inviting than a year or two ago. Rates of interest are declining, and the volume of capital seeking investment is larger. Competition is becoming more and more intense, profits narrower, and the great field for the investment of capital, and the exhibition of enterprise is being filled up. The period of activity now apparently drawing to a close, has lasted five years. During that time, according to statistics, the productive capacity of the country has been more than doubled; the railway mileage has been increased one-half; banking facilities have been wonderfully expanded; telegraph lines have been doubled in length; 3,000,000 have been added to our population, and our industrial activity has sought out scores of new fields for exercise, and has given an impulse to ingenuity and invention and skill, such as has been known in no other country or time. We seem to have reached a halting point in our progress; but the elements at work are gathering themselves together for a new advance. Cost of production is declining, and the cost of construction is correspondingly less; $50,000 in 1883 will, in some respects, do as much as $100,000 ten years ago. Competition, which is such a powerful factor at the present time, is due to the increase of capacity and the lessened cost of production and operation, in all the multitudinous avenues of activity. There are those who look with apprehension to the contraction of business and decline of railway construction, from the causes above given, as well as to a falling off in manufacturing activity, and in general, a period of greater or less inaction as a result of what they think has been an undue expansion of capacities. It is not to be wondered at that this view obtains in some quarters. Our progress has been phenomenal; but a careful investigation into the causes which control the nation's growth, shows conclusively that, instead of entering upon a career of comparative inactivity, the country is only entering a field wherein its enormous producing powers and half developed energies will find greater opportunities than they have yet enjoyed.

The strong factors in the problem of the future are, first, the volume of capital seeking investment, and second, the masses seeking employment. Neither can remain idle. The earning power of our railway system will, in a few years, be sufficient to practically wipe out the bonded indebtedness contracted at a high rate of interest. During the five years from 1873 to 1878, bankruptcy and failures wiped out a large portion of the indebtedness which had been accumulating for the five years previous; and in the past five years the profits of business have, in addition to paying the nation's way, canceled much of the indebtedness contracted during that period. The agencies which have been at work during the past ten years, both favorable and unfavorable, have resulted in the clearing up of a vast volume of indebtedness, and in put-

ting into operation a multitude of agencies which have stimulated enterprise, decreased the cost of production, and, in a word, made the productive power of the country greater than the present consumptive capacity. It is this mighty power, this volume of potential energy, which is mistaken for evidences of weakness. It is this wonderful capacity to do and to make, which has led the world to regard the present over production as an unfavorable omen or condition. The reverse is the truth. The only thing now wanted is for the consuming capacity to overtake this mighty producing power, and it is doing so every month and every day. A few months will make a transition of the great factors on both sides, and instead of the backwardness and fear now apparent, there will be confidence, energy, and greater activity. The capacity that is now creeping along on its hands and knees, so to speak, will be invested boldly in new enterprises. These general considerations can be expanded, and proofs can be enumerated to show that the prospects of the country for the next five years are more favorable than at any other time in our history.

The decline in the price of railway material, chiefly steel rails, has not developed a corresponding demand. The managers of the Bessemer Steel Rail Mills, with their thirty-eight converters, and a productive capacity of upwards of 2,000,000 tons per annum, are now considering the policy of restricting output and reducing wages. Orders come in slowly. The projection of new roads is heard of less frequently; most of the roads inaugurated a year ago are completed, and the shops and establishments engaged in the work of providing equipments and appliances are busily engaged in completing numerous orders for rolling-stock, motive power, etc. The next six months will be marked by unusual activity in this direction. The volume of traffic is increasing; investors in railway securities desire returns before risking further investments. The construction of 6,000 miles of road this year as compared to 12,000 last year, may look like a great falling off, but the present increase in traffic, the steady dividends, and the general increase in the earning capacity; the settlement of the great West and South; the influx of armies of foreigners; ease in the money market; all these, and a score of other and lesser influences, point to the strong probability of another revival in railway construction as soon as the present capital invested is firmly fixed in its earning power. This is an age of railroads 100 miles apart, so to speak. We shall soon enter an era when railroads will be fifty, twenty, and then ten miles apart, and that day is not so far distant as might be supposed. If the country from ten to twenty miles each side of a line is able to support it and yield satisfactory dividends, another road will soon be projected on the borders of this producing area, and lead to the construction of similar lines. Steel rails have declined, in a comparatively short time, from $55 to $35 per ton. Rolling-stock and motive power have similarly declined in cost. Most of the locomotive building works have orders from three to eight months ahead. Larger engines, and cars of greater capacity are being ordered. The cost of transportation has greatly declined per ton per mile, while the earning power of our railway system has not materially declined. The addition of three trunk lines between the seaboard and Chicago has, for the time being, checked the desire to build more fresh lines through the same territory; but the rapid building up of the northwest is likely to stimulate enterprise in that direction. A large amount of railway construction is projected in Michigan, Wisconsin, Iowa, Minnesota and Dakota. That section of the country is rapidly filling up, chiefly with foreign population of hardy workers, whose labor is forming the basis for a further expansion of railway construction, and the development of greater traffic.

Throughout the Southern States, a similar spirit of enterprise is leading to the construction of long and short lines, most of them, however, for the development of local traffic in mineral, lumber and agricultural regions. The capital which has been invested in the South has yielded very large returns, and every opportunity is now being seized which promises even moderate returns. Land has been bought for speculative purposes, and for development, and a multitude of new enterprises has taken root there which will develop results within the next twelve months. A recent estimate shows the railway construction contemplated south of the Ohio, and east of the Mississippi Rivers, at about 3,000 miles. Most of this will, no doubt, be so constructed, although this depends upon several contingencies. West of the Mississippi, a number of enterprises are under way, and before they are completed, it is probable that they will give rise to greater activity in the work of constructing shorter lines, for the development of mineral lands. Foreign capital is fully aroused to the advantages of investments in this section. The opening up of the Mexican Republic to capital and labor is affording a wide field for the smaller investors and manufacturers, and commercial agents who find in the great southwest a field full of great promise for future harvests.

The tariff question, the questions of internal revenue, national bankruptcy law, and the building up of a merchant marine, together with the development of our export trade, are a few of the leading questions which promise to occupy the attention of legislative, industrial and commercial minds for the next five or ten years. We must have a larger export trade, and the necessity for it is recognized on all sides. The Central and South American States are regarded as our own proper field; foreign factors have held possession, not because of any superiority in method or products, but because of the negligence and indifference upon the part of Americans. Capital is now seriously considering the project of building ships to take advantage of the opportunities looming up; but deficient legislation, and the absence of legislation which would virtually secure such investments, is holding much capital and much enterprise in check. In a few years it is probable that we shall have ship-yards able to compete with the Clyde. For the present, our progress must be by slow and well-measured steps. The great obstacle in the way of a rapid building up of our export trade on the basis of a merchant marine, is the high cost of production, growing out of the high cost of labor. There is a gradual equalization in progess in this respect. While labor will never decline to the low limits of foreign countries, it will gradually equalize itself thereto, while wages of foreign mechanics will improve, because of emigration, the growth of higher demands, and a multitude of minor agencies which will enter into the question of wages. The tariff contest promises to assume a shape which will make the building up of an export trade an easier matter. The

industrial interests are not united on this important point. The admission of raw material free of duty will be strenuously advocated, and in the end, that form of free trade will be established; but what is raw material to one, is the finished product to another, and this fact will lead to a constant struggle. But the outcome must be in lower duties, in order that the vast producing capacity of the shops and mills of the country may be profitably engaged in supplying not only the home trade, but the vast foreign trade, especially of the Central and South American countries, which can be secured as soon as we are in a position to compete with foreign producers.

The iron trade is passing through a season of low prices and dull demand. About two-thirds of the capacity is now engaged. Bar iron sells at 1¾ to two cents per pound; nails at $2.60 to $2.90 per keg, according to the location of mill. Spikes at $2.60; pig iron, $19 to $21 per ton for foundry, according to quality, and $17 to $18.50 for forge iron. Bessemer iron is $20 to $21; Spiegeleisen, $30 to $31; muck bars, $32 to $34, according to quality. Iron for engineering requirements, 2½ to 3½ cents per pound. Plate iron, 2½ to 5½ cents per pound. Sheet iron has been in very active demand all the season, but the falling off in requirements has caused a temporary dullness. The establishments manufacturing pipes are unusually busy, owing to the increasing demand for gas and steam pipe. The various steel mills in the country are turning out less steel than at any time in three or four years. The agricultural implement works, carriage works, and other establishments consuming iron and steel, report less activity. The importations of iron and steel are about half this year of what they were last year. Reductions in wages are announced to take place on January 1st, and it is probable that this reduction of the cost of production throughout the iron and steel trades will amount to about fifteen per cent. below present rates, excepting in those localities which are controlled by a sliding scale.

The coal trade is particularly active, and in the anthracite interests high prices are maintained by reason of the perfect organization of that interest, and the limited supply available. The market for this valuable fuel has been extended East, South and West. The local manufacturing demand is dull because of the inactivity in the iron trade, but this is fully offset by the opening up of the new markets in the regions mentioned. The bituminous coal field is the theatre of more activity and enterprise than for many years, and in Pennsylvania, Ohio, Virginia, and one or two other States, the bulk of the desirable coal area has been purchased by capitalists and syndicates for the purpose of holding for future development. Several hundred miles of coal roads have been constructed, and long and short lines are projected, to be constructed next year into the new coal fields in the North and South. This activity is due to the diversification of manufacturing interests, and the great increase in manufacturing.

The coke trade, especially in western Pennsylvania, is in a very favorable condition, barring low prices. In the Connellsville region, 11,000 ovens are profitably engaged. A syndicate is now in possession of nearly one-half of the entire producing capacity of the region. It is the intention of those controlling this syndicate to obtain possession of all, and possibly to the disadvantage of consumers, who will be deprived of the advantages of competition. Several new coke fields have been developed in other States, and it is quite probable that the demand for coke will lead to the opening up of new sources of supply, wherever mineral suitable for coking purposes can be found. The Southern coal fields are attracting more than usual attention but their remoteness from markets is a serious obstacle to their early development. The development of these fields will depend mainly upon the growth of local manufacturing interests.

THE New York *Times* remarks that, while the railway companies of this country were perfecting a new system of time standards in the United States, an international conference at Rome was endeavoring to establish a common meridian by which the time of the whole world should be governed. The conference has adopted the meridian of Greenwich, and it is expected that this action will be ratified by the nations of the civilized world. The plans of the railways in this country and of the Rome conference coincides so far as the United States is concerned, and this fact furnishes another argument in support of our new standards. With the prime meridian at Greenwich, there are to be twenty-three secondary meridians, just one hour apart in time, by which time in all parts of the world is to be regulated. Our railway time standard for the East—the seventy-fifth meridian—will coincide with the fifth secondary standard in the plan devised for the whole world, counting westward from Greenwich, and our other standards—those of St. Louis, Denver, and Carson City—will coincide with other secondary standards adopted by the international conference. It appears, therefore, that our national system will virtually be a part of the cosmopolitan plan.

OF ten transcontinental railroads in the New World, three have been completed. Taking the whole number in order, beginning north, the first is the Canadian Pacific Railroad, extending from the St. Lawrence to Port Moody in British Columbia. In the United States, the Northern Pacific extends from Lake Superior to Puget Sound and Portland; the Union-Central, from Council Bluffs, by the basin of the Great Salt Lake, to San Francisco; the Atlantic and Pacific, or thirty-fifth parallel route, from St. Louis through the Indian Territory, New Mexico, Arizona, and California, to the Pacific coast; and the Southern Pacific, which may be said to begin at New Orleans, extends through Texas to El Paso, thence westward through Southern New Mexico and Arizona to Fort Yuma, on the Colorado, and through California to San Francisco. The Atchison, Topeka, and Santa Fé Railroad has extended its lines far to the southwest, and has acquired, by purchase, the Sonora Railway, recently built northeastward from Guaymas, on the Gulf of California, towards the Santa Fé lines in Arizona or New Mexico. The transcontinental route thus made will end in Mexican territory. In Mexico a line crosses from Tampico to San Blas; and the second from Vera Cruz, by the city of Mexico, to Manzanillo, and another, the Tehuantepec Railroad, across the isthmus of that name. The Panama Railroad is the last to mention in the list of ten, completed or which will be completed.

SUSCRIBE for the AMERICAN RAILROAD JOURNAL.

A Railway Mission Car.

It may be a new name, and seem a novel idea to some, to see the word "mission" in any way connected with the railway service; but the strangest thing about it is, that the name and the work have not been adopted long ere this. More than twenty years ago, the Sunday school children of this country built the missionary vessel, "Morning Star," by their contributions. It has proved a success. Seamen's Chapels have been established for years, and many a floating bethel has been a snug harbor for sailors. For twelve years, mission work in its broadest and fullest sense, has been carried on among railway men. Its methods have been through libraries, reading rooms, cottage meetings, and the agency of men fitted for the work, who have been employed and paid by the corporations as general secretaries. The Vanderbilt lines have been among the foremost to endorse these methods.

The effort to establish Mission Cars has grown out of necessities developed in evangelistic labors by those engaged in that branch of the work from the Woman's Christian Temperance Union, and others. The Baltimore and Ohio, one of the leading corporations of this country, has been notably in the advance in this method. It has lighted, warmed, and given the free use of buildings along its line for the purpose of holding Gospel Temperance meetings, Bible readings, etc., thereby promoting and stimulating the best interests of its employés. It has aided those engaged in the work in many important and legitimate ways, reaping the best results in its own interests.

While meetings were being conducted at South Baltimore, in 1881, among the railway men living in that section, it became a very important matter to secure some convenient place for holding services in the immediate vicinity of the Baltimore and Ohio shops. An old car which was used to bring the workmen out from the city in the morning and carry them back at night, stood upon the siding. Leave was obtained to use this car for the meetings. In this car that grand work began, which has spread westward more than five hundred miles along the line of the Baltimore and Ohio railroad, and which is now destined to spread over this continent.

As a result of the success, and the wide field opening before this branch of mission work, the plan of Mission cars was suggested. Its practicability has been demonstrated. It remains that it be carried on under wise and judicious management. Below we give a floor plan of the Mission Car "Bethlehem," for the building of which, efforts are now being made to raise funds. We have already given a brief outline of the project.

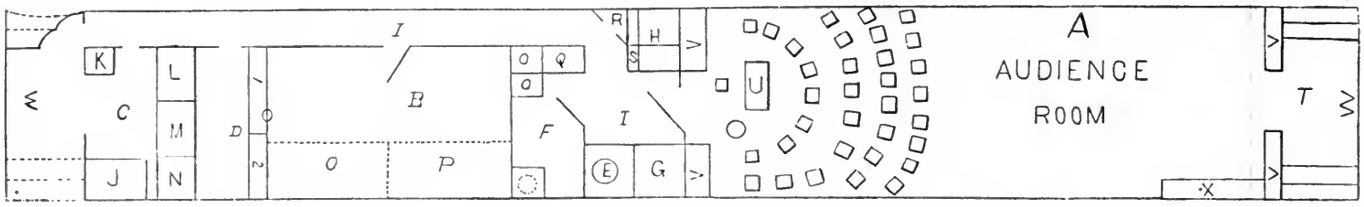
DESCRIPTION OF CAR.

A. Audience room, 29x8-10 (seats 50 persons); B. Dining room, 12x6-10; C. Kitchen, 5½x6-10; D. Pantry, 3½x6-10, with cupboards 1-2; E. Heater, 2½x3; F. Toilet, 3½x5; G. Closet, 2½x3; H. Closet; I. Passage; J. Range; K. Sink; L. Locker; M. Locker; N. Coal box; O. Page Bed; P. Page Bed; Q. Wardrobe; R. Wardrobe; S. Water-tank; T. Entrance to audience room; U. Organ; V. Seats, permanent; Z. Camp-stools used for seats; W. Platforms; X. Library for books.

The exterior resembles an ordinary first-class passenger car. It is 58 ft. 6 in. in length, 9 ft. 6 in. in width, and stands about 13 ft. 10 in. in height above the rail. The interior is divided into three apartments. The main, or audience room is arranged for a reading room when not otherwise in use. It is to be furnished with a carefully selected library, and to be supplied with magazines, illustrated and daily papers. Its principal use, however, will be for holding Bible readings and Gospel meetings. It is to be supplied with a good organ for singing classes and song service.

The cooking and sleeping apartments, toilet rooms, etc., occupy the rear of the car, and are conveniently arranged so that those in charge of the work can remain with the car night and day. In short, the car is a portable church and parsonage.

The sum which it is desired to raise for this enterprise, is $18,000, divided into shares of $10 each. About $10,000 will be required in building the car and in its outfit. The balance to be reserved as a fund for defraying necessary expenses, repairs, etc.



Mr. E. A. Harris, of Fitchburg, Mass., is acting for the present, in charge of moneys and pledges, to whom subscriptions may be sent, or of whom inquiries in regard to the work may be made. He is a conductor on the Old Colony Railroad, and his integrity is "indorsed" by many prominent persons, including the Rev. G. R.W. Scott, D.D., Rev. S. L. Blake, D.D., Rev. E. H. Smith and ex-Congressman Norcross, of Fitchburg.

Louisville and Nashville Railroad.

The earnings of the Louisville and Nashville Railroad Company for the years ending June 30, 1882 and 1883, were as follows:

	1882.	1883.
Main Stem	$ 2,946,424 64	2,946,239 64
Bardstown Branch	24,754 77	24,117 52
Lebanon-Knoxville Branch	385,141 14	467,773 07
Richmond Branch	45,790 54	28,960 13
Cecelian Branch	45,833 60	.....
Memphis Line	1,042,008 59	1,138,964 43
Evansville, Henderson and Nashville Division.	1,101,135 22	1,099,706 07
St. Louis Line	838,523 22	931,404 77
New Orleans and Mobile Railroad	909,860 29	1,017,786 53
Pontchartrain Railroad	14,396 08	12,849 59
Nashville and Decatur Division	1,101,608 99	1,034,230 95
South and North Alabama Railroad	1,311,253 53	1,508,740 18
Mobile and Montgomery Railway	987,354 39	1,119,238 67
Pensacola Division	180,834 33	153,701 59
Pensacola and Selma Division	60,998 01	62,542 15
Montgomery and Selma Division	100,265 43	100,168 16
Cumberland and Ohio Railroad—Southern Division	42,978 72	40,507 12
Glasgow Railroad	20,013 80	19,280 91
Cincinnati Division	574,320 96	960,709 46
Lexington Branch	227,769 45	337,386 65
Shelby Branch	30,977 15	72,928 83

Cumberland and Ohio Railroad—Northern Division	13,312 36	30,430 42
Louisville Railway Transfer Co	74,981 99	113,941 80
Louisville, Harrod's Creek and Westport Narrow Gauge Railroad	7,026 85	14,224 64
	$11,987,744 55	$13,234,916 28

Operating expenses:

Main Stem	$1,278,432 26	$2,238,181 15
Bardstown Branch	19,010 16	16,313 37
Lebanon-Knoxville Branch	206,190 22	256,945 10
Richmond Branch	31,827 28	27,545 00
Cecelian Branch	35,620 79	.....
Memphis Line	793,793 70	767,097 54
Evansville, Henderson and Nashville Division	613,790 16	657,530 82
St. Louis Division	617,731 21	627,520 68
New Orleans and Mobile Railroad	534,146 62	602,094 02
Pontchartrain Railroad	21,115 78	21,968 69
Nashville and Decatur Division	656,679 75	654,024 13
South and North Alabama Railroad	965,149 61	1,032,401 52
Mobile and Montgomery Railway	693,257 27	744,802 95
Pensacola Division	145,490 76	125,927 76
Pensacola and Selma Division	88,941 85	65,276 52
Montgomery and Selma Division	81,895 08	63,317 30
Cumberland and Ohio Railroad	25,183 51	31,163 80
Glasgow Railroad	13,583 26	13,099 01
Cincinnati Division	437,004 86	746,390 12
Lexington Branch	118,973 59	235,745 68
Shelby Branch	32,197 53	43,574 40
Cumberland and Ohio Railroad—Northern Division	19,591 65	39,595 02
Louisville Railway Transfer Co	39,607 33	70,990 70
Louisville, Harrod's Creek and Westport Narrow Gauge Railroad	14,156 02	18,090 47
	$7,429,370 35	$8,099,595 75

Net earnings:

Main stem	$1,667,992 38	$1 708,058 49
Bardstown Branch	5,744 61	7,804 15
Lebanon-Knoxville Branch	178,950 92	210,827 97
Richmond Branch	13,963 16	1,415 13
Cecelian Branch	10,212 81	.....
Memphis Line	302,214 89	370,966 89
Evansville, Henderson and Nashville Div'n	487,345 06	442,175 25
St. Louis Division	220,792 51	303,884 09
New Orleans and Mobile Railroad	375,713 67	415,692 51
Pontchartrain Railroad—Loss	6,719 70	9,119 10
Nashville and Decatur Division	344,929 24	380,206 82
South and North Alabama Railroad	346,103 92	476,338 66
Mobile and Montgomery Railway	294,277 12	374,435 72
Pensacola Division	35,343 57	27,773 83
Pensacola and Selma Division—Loss	27,943 84	2,734 37
Montgomery and Selma Division	28,370 35	36,850 86
Cumberland and Ohio Railroad—Southern Division	17,795 21	9,343 32
Glasgow Railroad	6,430 54	6,181 90
Cincinnati Division	137,316 10	214,319 34
Lexington Branch	108,795 86	101,640 97
Shelby Branch—Loss in 1882	1,220 38	29,354 43
Cumberland and Ohio Railroad—Northern Division—Loss	6,279 29	9,181 60
Louisville Railway Transfer Co	35,374 66	42,951 10
Louisville, Harrod's Creek and Westport Narrow-Gauge Railroad—Loss	7,129 17	3,865 83
	$4,558,374 20	$5,135,320 53

The following statement will show the sources from whence the above earnings were derived:

	1882.	1883.
Freight earnings	$8,050,339 04	$8,786,574 49
Passenger earnings	3,007,464 74	3,379,178 26
Express service	246,216 97	390,605 26
Mail service	280,806 71	291,880 83
Train privileges	8,338 20	8,331 86
Rent passenger cars	41,462 11	39,965 03
Rent freight cars	153,298 79	205,252 46
Detention of cars, storage, etc.	1,587 02	1,504 29
Pig iron storage	3,516 50	3,002 58
Rent engines	134,164 30	175,256 22
Rents	32,478 63	31,468 00
Net profits on Commissary Department	26,160 10	20,609 20
Bridge tolls	.....	587 80
Advertising on freight cars	.....	700 00
Wharfage and storage	1,909 44	.....
Total gross earnings	$11,987,744 55	$13,234,916 28
Expenses, as above	7,429,370 35	8,099,595 75
Net earnings from traffic	$4,558,374 20	$5,135,320 53
Realized from investments	266,442 35	134,770 05
Total credited to income account	$4,824,816 55	$5,270,090 58

The charges against income account in the fiscal year 1882-'83, were:

Interest and rentals	$4,207,984 00	
Taxes	339,409 18	
		4,547,393 18
Net surplus for the year		$722,697 40

—of which $397,481.06 has been absorbed in the payment of sinking funds, reducing to that extent the bonded indebtedness; and $250,065.35 was expended in new construction, improving the property and leading to a reduction in the cost of operation.

The average length of roads operated for the year was 3,032 miles—showing that the gross earnings per mile were $6,513.24, the operating expenses $3,986.02, and the net earnings $2,527.22.

The ratio of operating expenses to earnings in 1882-'83 was 61.20 per cent. as against 61.97 per cent. in 1881-'82.

A further analysis of the report for the year ending June 30, 1883, shows that the earnings of the Main stem were: from freight $1,856,496.98, passengers $546,981.37, mail $56,867.69, express $65,167.19, miscellaneous $420,726.41; of the Bardstown Branch: from freight $14,627.57, passengers $7,934.05, mail $768.63, express $645.83, miscellaneous $141.44; Lebanon-Knoxville Branch: freight $320,261.08, passengers $130,209.87, mail $7,146.94, express $8,637.73, miscellaneous $1,517.45; Richmond Branch (July to December, 1882): freight $18,131.74, passengers $9,312.14, mail $1,055.34, express $379.27, miscellaneous $81.64; Memphis Line: freight $677,069.55, passengers $370,793.83, mail $56,953.84, express $30,560.41, miscellaneous $2,686.80; Evansville, Henderson and Nashville Division: freight $883,490.23, passengers $196,335.42, mail $10,023.36, express $8,636.53, miscellaneous $1,220.53; St. Louis Division: freight $650,412.96, passengers $243,215.10, mail $15,119.18, express $19,225.54, miscellaneous $3,430.99; New Orleans and Mobile Railroad: freight $577,010.25, passengers $380,141.82, mail $28,529.88, express $21,872.85, miscellaneous $10,231.73; Pontchartrain Railroad: freight $2,450.93, passengers $10,307.66, miscellaneous $91; Nashville and Decatur Division: freight $784,422.10, passengers $213,666.65, mail $13,744.74, express $16,001.92, miscellaneous $6,395.54; South and North Alabama Railroad: freight $1,171,264.82, passengers $291,832,87, mail $12,077.95, express $18,232.87, miscellaneous $15,331.67: Mobile and Montgomery Railway: freight $735,460.63, passengers $311,081.03, mail $34,107.76, express $27,418.55, miscellaneous $11,170.70; Pensacola Railroad: freight $107,841.26, passengers $40,458.70, mail $1,920.72, express $2,322.46, miscellaneous $1,158.45; Pensacola and Selma Division: freight $48,119.84, passengers $11,378.30, mail $1,719.39, express $696.94, miseellaneous $627.68; Montgomery and Selma Division: freight $44,328.60, passengers $50,247.62, mail $3,287.32, express $1,573.64, miscellaneous $730.98; Cumberland and Ohio—Southern Division: freight $26,245.60, passengers $12,097.98, mail $1,361.46, express $773.48, miscellaneous $28.60; Glasgow Railroad: freight $11,178.34, passengers $7,185.45, mail $518.52, express $398.60; Cincinnati Division: freight $526,629.88, passengers $338,524.64, mail $37,356.32, express $48,661.91, miscellaneous $9,728.71; Lexington Branch: freight $158,129.72, passengers $155,728.54, mail $5,559.90, express $16,612.09, miscellaneous $1,356.40; Shelby Branch: freight $45,500.07, passengers $24,648.44, mail $834.22, express $1,933.23, miscellaneous $12.87; Cumberland and Ohio—Northern Division: freight $16,450.94, passengers $11,804.39, mail $1,310.27, express $846.22, miscellaneous $1.60; Railway Transfer: freight $105,444.80, passengers $7,302.81, mail $1,194.19; Narrow Gauge Railroad: freight $5,605.60, passengers $8,189.58, mail, etc., $429.46—total, as above, $13,234,916.28.

The extension of the Lebanon-Knoxville Branch southward from Livingston reached the Cumberland River in December, 1882, and the Tennessee State Line at Jellico,

60½ miles from Livingston, in April, 1883. It was opened for local traffic to Williamsburg, 49 miles south of Livingston, in December, and through trains between Louisville and Knoxville commenced to run on the 4th of June.

The Madisonville Branch, extending from Madisonville, on the main line of the Evansville, Henderson and Nashville Division, to Providence, Ky., 16 miles, was completed and opened to business in November, 1882. It is operated as a part of the Evansville, Henderson and Nashville Division.

The Pensacola and Atlantic Railroad, running eastward from Pensacola, Florida, was finished to the Apalachicola River in January, 1883, and the bridge over that river at Chattahoochee was completed in April, enabling through connections at that point with the railroad systems of southern Georgia and of eastern and central Florida. This road is not operated as a part of the Louisville and Nashville system—the company being interested in it only as owner of $1,550,000 of the $3,000,000 capital stock.

The Owensboro and Nashville Railroad, which is also operated under separate organization, is 36 miles in length, extending from Owensboro south. Arrangements have been made and funds provided, by the assistance of this company, to extend it during the present year to Adairville, a further distance of 49 miles. The company owns $959,400 out of a total issue of $1,156,500 of the capital stock.

The company also owns $105,000 of the $200,000 capital stock of the Nashville and Florence Railroad Company, and has advanced on the securities of that company the funds required to extend its road to the Tennessee and Alabama State line, 56 miles from Columbia; 20 miles of the road from Columbia, south, are now in operation, and the other 36 are under contract to be completed by January 1, 1884.

During the year the company has advanced to the Henderson Bridge Co. $86,723.81, making the total amount advanced to June 30, 1883, $146,885, all of which has been expended on the bridge and its approaches—including payments for right of way for the greater part of the nine miles of railroad which is being constructed from the terminus of the bridge in Indiana to the city of Evansville. It is expected that the bridge will be completed by January, 1885.

The net income of the Georgia Railroad (in which this company is jointly interested with the Central Railroad Co. of Georgia) for the fiscal year ending March 31, 1883, was $619,712.63, against $449,521.18 for the preceding year, an increase of $170,191.45. Out of the net income of these two years the lessees have expended $120,844.18 in the extension of the Athens Branch.

The surplus income of the Nashville, Chattanooga and St. Louis Railway (which operates under its own organization, but in which this company owns a majority of the capital stock) for the year ending June 30, 1883, was $376,445.53, against $289,021.10 in the preceding year, an increase of $87,424.43. Out of the surplus of 1882–'83 there was expended $104,465.32 for improvements and additions to property, leaving an unexpended surplus of $271,980.21. There was also declared a dividend of two per cent., amounting to $133,400, payable October 1, 1883: the last previous dividend was in April, 1882, when one and one-half per cent. was declared. The net earnings of this road for the months of July and August, 1883, give an increase of $47,565.67 as compared with 1882, and $77,520.50 as compared with 1881.

The length of roads operated by the company, June 30, 1883, was as follows: owned absolutely, or through the ownership of the entire capital stock, 1,616.35 miles; operated under lease, 260.04 miles; operated for account of South and North Alabama Railroad Company (being the owner of a majority of its capital stock), 188.88 miles, making a total of 2,065.27 miles, against 2,028 miles in 1882, an increase of 37.27 miles; and the average miles operated for the year 2,032 against 1,971 in 1882, an increase of 61.

In addition to the 2,065.27 miles of road operated by this company, it is also interested, as the owner of a majority of the capital stock of the company operating outside of its own system, in the Nashville, Chattanooga and St. Louis Railway 554 miles, the Pensacola and Atlantic Railroad 161 miles, the Owensboro and Nashville Railway (of which 44 miles have been completed, and 41 miles are under construction) 85 miles, and the Nashville and Florence Railroad (of which 20 miles have been completed and 36 miles are under construction) 56 miles, and as joint lessee with the Central Railroad Company of Georgia of the Georgia Railroad and dependencies 614 miles.

At the close of the last fiscal year (June 30, 1882), the capital stock of the company amounted to $18,133,513; since that date the $3,080,000 stock held by the City of Louisville (as security for the loan to this company of its $850,000 bonds), has been released, increasing the capital stock to $21,213,513; a further increase of $8,786,487 was authorized at the annual meeting of the stockholders, held October 4, 1882, making the total amount, June 30, 1883, $30,000,000, of which $25,000,000 has been listed in New York, and the remainder is in the company's treasury. From sales of the stock thus released, and of the increased stock so listed, $2,575,090 have been realized to the treasury of the company.

The total mortgage debt of the company (not including $1,500,000 Lebanon-Knoxville Branch bonds, $2,677,000 Mobile and Montgomery Division bonds, $1,248,000 Pensacola and Selma Division bonds, and $3,208,000 Louisville, Cincinnati and Lexington Railway general mortgage bonds, which are included in the $10,000,000 Trust bonds) amounts to $57,903,230, which added to the $25,000,000 of capital stock, gives a total of $82,903,230. The mileage of roads upon which the above debt and stock are based is as follows: owned absolutely, 976 miles; owned absolutely and not completed, 32 miles; roads in which the capital stock is owned entirely by the company, 720 miles, a total of 1,728 miles; the bonded debt and capital stock being therefore equivalent to $47,976 per mile.

The total expenditures during the year for improvements and additions to the several properties amounted to $675,512.57, from which has been deducted $142,652.07 on account of over run, in the year 1882, in materials charged out above cost, leaving the net amount charged to construction account $532,860.50, which has been provided for as follows: from car trust of 1881, $282,795.15; and from earnings, $250,065.35.

Of the 2,065 miles of road operated, 1,276 miles are laid in steel and 789 in iron; of the above, 1,713 miles are main

lines, of which 1,264 are laid in steel and 449 miles in iron.

The total fixed charges against income account for the ensuing year (1883-'84) for interest on bonds, rentals and guaranteed dividends—not including general interest account, which is more than offset by balances carrying interest due this company—is stated at $4,268,377.

The floating debt of the company, as given in the annexed statement, (excluding bills and pay rolls for June, and interest due July and August) shows $1,065,310.74 against $2,662,554.42 at the close of the previous year.

During the first three months of the present fiscal year the gain in earnings was over $460,000, while the operating expenses run about 58 per cent.

COST, RESOURCES AND LIABILITIES.

Total cost of road to June 30, 1883		$67,385,425 70
Sinking fund Louisville, Cincinnati and Lexington Railway	$50,000 00	
Bonds owned by the company	1,072,380 00	
Stocks owned by the company	8,565,852 31	
United States Government 3 per cent. bonds	868,243 09	
		10,556,475 40
Nashville and Decatur Railroad Company	573,043 73	
South and North Alabama Railroad Company	1,454,903 60	
Mobile and Montgomery Railway Company	143,540 08	
Owensboro and Nashville Railway Company	347,136 08	
Pensacola and Atlantic Railroad Company	148,982 34	
Nashville and Florence Railroad Company	135,146 91	
Henderson Bridge Company	146,885 00	
		2,949,637 74
Due from transportation	$566,661 47	
Bills receivable	586,584 59	
Sundry railroads and persons	858,084 00	
Real estate, quarry and timber lands	715,752 71	
		2,727,102 77
Shop, road, and fuel supplies	$833,112 33	
Cash	242,925 89	
		1,076,041 22
Stocks and bonds held in trust (net amount)		9,527,877 74
Total		$94,222,560 57
Capital stock		$30,000,000 00
Mortgage debt		57,903,230 00
Due sundry railroads and persons	$502,657 99	
Bills payable	526,558 32	
Back dividends	36,094 43	
Bills and pay-rolls for June	628,278 48	
Interest due July 1 and August 1	445,358 92	
		2,138,948 14
City of Louisville bonds	$850,000 00	
Debentures, account recent acquisitions	567,400 00	
		1,417,400 00
Profit and loss account		2,762,982 43
Total, as above		$94,222,560 57

President—C. C. BALDWIN.

Vice-President—MILTON H. SMITH.

Second Vice-President—GEO. A. WASHINGTON.

Third Vice-President—F. D. CARLEY.

Directors—C. C. Baldwin, F. D. Carley, E. H. Green, John E. Green, Jay Gould, W. C. Hall, J. S. Rogers, Thomas F. Ryan, Russell Sage, Geo. A. Washington, W. F. Whitehouse, W. S. Williams, Jas. T. Woodward.

Secretary—WILLIS RANNEY.

Ass't to President and Ass't Secretary—A. M. QUARRIER.

General Manager—MILTON H. SMITH.

THE recent death of the Hon. Ginery Twitchell, of Massachusetts, recalls the old stage-coach days in New England. Forty years ago Mr. Twitchell was a famous stage driver. He lived to become a railroad president, and for six years was a Representative in Congress. The main stage line ran north through Massachusetts, with branches into New Hampshire and Vermont. He performed remarkable feats in the way of getting the mails through on time. On one occasion a blinding snow storm came on with such fury that it was impossible for horses to travel. He put on snow shoes, and carried the mail bag on his back from Worcester to Coldbrook, seventeen miles, in five hours.

Growth of the Train Brake.

ANGUS SINCLAIR, IN AMERICAN MACHINIST.

ALTHOUGH a velocity equal to the highest speed common with railroad trains of to-day was attained during the first ten years of railroad practice, almost forty years elapsed after railroad locomotion was a pronounced success, before any reliable system was established of bringing trains quickly to a state of rest. Up to the year 1870 the ordinary fast train resembled in a striking manner the Congreve ricochet-rocket, made famous in the early railway days to illustrate the helpless condition of a fast running train. The power was there to originate the speed, but when a sudden demand arose for stoppage, in too many cases the only retarding forces available were the natural resistances to the moving mass. In regard to the speed of trains, railroad engineers resembled Ulysses when he released the winds, and raised a tempest that he could not subdue.

This condition of helplessness led to many a grievous disaster before the traveling public were educated to demand with the voice of authority, appliances for stopping trains promptly whenever necessary or desirable. And then it was no easy matter to impress railroad managers with the belief that a good system of brakes could be devised, which would do the work of absorbing the speed far more quickly than steam could produce it.

During the first decade of railroad life, engineers were so much occupied with plans and improvements for increasing the efficiency of the locomotive as an agent of speed and traction, that almost no attention was bestowed upon the means of restraining or controlling the velocity attained. This was all the more surprising, as the locomotive of these times equipped with drop hooks was a peculiarly helpless machine, when called upon to aid in stopping the train it had set in motion. With the link motion of later years, the steam could be depended upon by reversed motion to aid in stopping; but the drop-hook nearly always failed to catch when an attempt was made to reverse the motion when the engine was running at any speed, and the V hook was not much better. Yet with this helpless condition of the locomotive, the rude brake that controlled the country wagon was deemed sufficient for holding passenger trains.

A horizontal lever with a bell crank at the end, to which was connected a wooden block, was the first form of brake used. When a call for brakes was made, the brakeman dropped the lever out of its notch, and stood upon it to increase the pressure upon the wheels. Some early roads were not even so well provided as this with the means of stopping. It is recorded that on a South Carolina railroad, for some time after trains began to run regularly, the only means of stopping a train at a station was by all the men round clinging to the cars holding them back, or by pushing pieces of cord-wood between the spokes of the wheels.

On most roads the hand-lever brake was early displaced by the hand-wheel and chain for passenger equipment, an improvement which rapidly became the recognized method of stopping trains. When the four-wheel truck first came into use, the brake attachment consisted of four vertical wooden blocks, two of which were hung between each pair of wheels, and were applied by a canting bar fastened between the blocks, and operated by a lever connected with

the chain. The wooden blocks were lined with leather which endured the rubbing wear of the wheels better than the wood, besides being easily renewed when worn. This crude rig was superseded before 1840 by the common freight car brake of 1883, which has experienced remarkably few improvements since it was invented. Wooden blocks have been exchanged for iron shoes, and the working parts have been made a little stronger. Where power is applied to the brake, some complication of levers has been introduced to equalize the pressure, but the brake is essentially the same as it was in 1840.

The common car brake had points about it which gave strong recommendations in the eyes of railroad men. It was simple and tolerably efficient for slow speeds, and it rarely got out of repair, while every part about it was easily reached, and any man could understand it. By degrees it worked into universal favor, not only with railroad men, but also with the traveling public. By the time trains became heavier and the common speed too high for safe control by any hand-brake, this brake had become time-honored, and it is always a difficult matter superseding a time-honored institution, however long it may have outlived its usefulness.

The first ten years of railroad life were remarkably free from serious accidents resulting in loss of life. This permitted the crude methods of operating to be accepted as satisfactory. Had any of the terribly fatal accidents which happened later through defective brakes and want of signals, taken place in the first five years of train service, the probability is that operating appliances would have been improved, so that much subsequent destruction of life and property would have been avoided. What were really reckless practices, were regarded as ordinary concomitants of the new method of transportation. Recurring fatal accidents were needed to convince the public that the hand-brake was not perfect. The grim missionaries, Disaster and Death, went the rounds of railroad trains with appalling frequency, before the first American locomotive was twenty years old, and inventors were called upon to provide better means for controlling trains.

Ever since the need of a brake superior to a hand-brake became recognized, those possessing the highest mechanical talent of the country have labored to produce a brake whereby the whole train would be automatically subjected to retarding action. The first attempts in this line were made to devise means of operating the brakes from the crowding together of the cars. This class of brakes are known as bumper brakes, and the crop of patents for devices of this kind has been remarkably fertile. It began to grow about 1845, and the harvest is not yet over. No bumper brake came into practical use in the days when an improvement on the single hand-brake was urgently needed.

The first real improvement effected on the hand-brake was the connecting of the brake on both trucks, so that the hand-wheel at one end of a car applied the brake to both trucks. By means of this invention a brakeman could apply brakes to four trucks, without having to move except from one platform to another. It almost doubled the work that one brakeman could do. The credit of this invention is no doubt due to Willard J. Nicholls, car-shop foreman of the Hartford and New Haven Railroad. He did not patent his invention, and others appropriated its valuable features, passing it through the patent offices as their own. The invention drew many thousands of dollars from railroad companies, but none of the money went into the pockets of the real inventor. The Tanner brake of litigious memory appropriated the Nicholls invention entire. The Hodge and the Stevens brakes each were arranged to apply the brakes on both trucks from one end of the car; but neither of the inventors claimed that as the object of their patent. Their patents were obtained for certain arrangements of the rods and levers used in transmitting the power applied. Hodge received the patent for his brake in 1849, and his leading idea seemed to be the simplifying of the connections. When the Stevens brake was patented in 1851, the inventor claimed that by the arrangement of rods and levers, each wheel in both car trucks received a uniformly retarding force. This was the first claim for equalizing the pressure on brake shoes. Both these brakes proved highly successful. Within a few years one or the other of them was applied on nearly all passenger train equipment, and to the double trucked cabooses belonging to freight trains. And to-day the brakes hold a monopoly in these positions, the application of continuous power having interfered in no way with the original arrangements of these brakes.

The increase of train accidents, and the growth of public sentiment in favor of improved means of controlling trains, can be traced very clearly in the records of the Patent Office. Singularly enough, the American public have never looked with any favor upon signals, as a means of averting accidents. They call for means of seeing the track at all times, and for facilities for stopping in time to avert an accident after an obstruction is perceived.

Very few patents for brakes were applied for during the first fifteen years of railroad operation. The officials in the Patent Office were not very well informed in those days regarding brakes, for in 1847 we find them reporting, "two patents had been granted for valuable improvements in carriage brakes, which it would be difficult to describe intelligibly, and which will therefore be passed over." One of the "valuable improvements" alluded to was a worthless bumper-brake that never amounted to anything, and was utterly impracticable for the purpose for which it was intended. After this, the call for a good brake drew so many inventors upon the field, that before many years passed the Patent Office authorities had their experience wonderfully developed in that line. The year 1849 recorded five patents. In 1852 patents were granted to ten inventors of brakes, among them being the first steam brake, which was patented by Thomas Walber. A patent was taken out this year for equalizing the pressure on the blocks by means of springs. Few patents were granted in 1853, but two of them made their mark. The Creamer brake made its first appearance, and Stephen Morse, of Springfield, Mass., patented a cast-iron brake shoe, to be hung in such a position that it would fall from the wheel by its own gravity when not in use. The device invented by Wm. G. Creamer was the attaching of springs to the brake staff, and winding them up like the main spring of a watch, and holding the tension by a pawl which kept the brake off. This pawl was connected with the bell rope, and the engineer, when he needed to make a sudden stop, could apply all the brakes by jerking the rope. This brake was greatly improved in 1856, which made it the most successful emergency brake in use till the air brake appeared. By the year 1854, when twelve new brakes be-

came candidates for patronage, the period of brake improvement may be said to have fairly opened. Every succeeding year found increasing lists of new brakes, and inventors are still laboring industriously in a line that is now pretty well crowded.

Among the numerous brakes invented since 1850, there have been many devices possessing neither practical merit nor inventive ingenuity. Not a few of the appliances, on the other hand, showed the stamp of decided mechanical ability in adapting means to an end extremely difficult to accomplish. About this time, a persistent struggle was made to produce an easy working and practical continuous brake, whereby the engineer could control the train at will. In this respect the Creamer brake was too one-sided. It was all go, or all stop! Different forms of bumper brakes were tried, and chain brakes were invented in various shapes. The first practical brake of the latter form was the Loughridge, which was invented in 1855. It was a chain brake, and worked fairly. More than one attempt was made to do the braking by means of shoes that were dropped on the rail, and received pressure from the weight of the car. By those who supposed that sliding the wheels gave perfection of retarding force, the rail shoe plan was strongly urged, for it seemed to obtain the maximum holding result without damaging the wheels. To provide an automatic brake that would stop the train when the coupling parted, several complex devices of cogs, ratchets, chains and minor connections were produced. The trouble with these inventions was that the parts were too numerous for the rough usage of train service. Different bumper brakes aimed to be automatic in case of accident; but as none of the early inventions of this kind worked satisfactorily in making ordinary stops, their merits for meeting emergencies were never developed.

Surprise is often expressed that none of the numerous inventors who devoted their attention to brakes succeeded in producing a practical working continuous brake, before the air and vacuum brakes achieved success so late as 1870. The probability is that several of the inventions between 1845 and 1860 might have been developed into fair continuous brakes, but railroad companies gave inventors no encouragement. Most of railroad managers considered that the hand-brake was perfection, and they had no patience with inventors who disturbed the public mind with the impression that a safer and more effective brake could be produced. Where an appliance has to perform the complicated functions required of a continuous brake, the parts have to be finely adjusted and well proportioned for the work they must perform. To adjust a brake so that it could be operated effectively from one point, and yet be strong enough in every particular to stand the rough jostling of a train in rapid motion over an uneven track, where no two trucks stand in the same horizontal plane, was an extraordinarily difficult mechanical feat. All the details could hardly be evolved complete from the brain of the most accomplished inventor. Experience and observation in actual service were needed, so that weak points might be strengthened, and mistakes rectified. Numerous valuable inventions that were crude on first conception have been perfected in this manner. The first continuous brake needed to go through this ordeal, but it was practically impossible to induce railroad men to give it the opportunity for a thorough trial. An inventor might have the elements of an excellent brake, but if a minor part failed in a trial reluctantly granted, the brake was sneered into oblivion.

If railroad authorities in this country were slow in recognizing the necessity of a good continuous brake, those of other countries were equally behind. And with American inventors and American railroad managers lies the credit of having produced the only good automatic brakes that have been applied successfully in stopping trains.

Our English Letter.

Written Specially for the American Railroad Journal.

During the late session of Parliament fifty-eight railway bills received the royal assent. All of these were promoted by existing companies. The greatest extension provided for is a length of over fifty-eight miles, to be constructed by the Great Eastern Railway, with a proposed capital of £1,750,000, and borrowing powers to the tune of another half million pounds. England is provided with an unrivaled quantity of railways already, its tiny surface, as compared with your huge continent, being taken into account; but much remains to be done before a sufficiency can be recorded. Places so remote from the screaming locomotive are yet to be found, that the silence of the past centuries rests upon them. The thunder of nineteenth century progress never reaches the ears of their simple residents.

Although my last letter has a good deal in it about the late meeting of the British Association, held at Southport, I shall not be tedious in referring to one of the numerous excursions organized to promote its usefulness and pleasure. That I refer to had the Mersey Tunnel as its objective point, where two borings are being driven, one above the other. *Engineering* contains perhaps the best account of them. The lower is a drainage heading, and starting from the bottom of a shaft 180 feet deep, it rises with a gradient of one in five hundred towards the center of the river. It is taken out by hand to ten feet four inches in diameter, and is then lined with brickwork in cement, fourteen inches thick, thus leaving a net diameter of eight feet. At the time of the visit, an interval of five hundred and thirty yards separated the ends of the headings, which were being driven from the opposite banks of the river. The main tunnel, which is twenty-six feet wide and 20 feet high inside the brickwork, is reached by a shaft 90 feet deep, and is already completed for a considerable distance under the river bed, although of course it is far behind the drainage heading. The water is raised by compound differential pumping engines, of the type manufactured by Mr. Henry Davey. At the Liverpool end there are two engines, one capable of raising 288,000 gallons per hour, and the other of 96,000 gallons. The chief peculiarity of the differential engine is that it is capable of working with a high grade of expansion without the controlling action of a crank or fly-wheel. The water column and spear rods constitute a reciprocating mass, which performs the functions of a fly-wheel, and enables an eight or ten-fold expansion to be employed. The term "differential" is applied to the engine, because of its peculiar valve gearing, by which the engine motion is communicated to its own steam valves through the medium of a floating lever, having no fixed fulcrum, but which is made to move by independent mechanism in the

direction required for opening the valves, whilst the engine motion is imparted to the same lever in the direction for closing them. The resultant of the two antagonistic motions is that actually imparted. The independent motion is adjustable, and is rendered uniform, so that any increase in the velocity of the engine motion causes the valves to close earlier than they otherwise would. There is, therefore, a peculiar element of safety in this engine. The pumps are of the ordinary bucket lift kind with spears in the rising main.

A less pleasant subject is the returns made by the Board of Trade of accidents and casualties on railways in the six months ending June 30, 1883. During that period there were 553 persons killed and 2,047 injured on railways in the United Kingdom, as compared with 532 killed and 2,072 injured in the corresponding period last year. In 1882 the total number of persons returned to the Board of Trade as having been killed in the working of the railways during the year was 1,121, and the number of injured 4,601. Of the above numbers—127 persons killed and 1,739 persons injured, were passengers; but of these only eighteen were killed and 803 injured in consequence of accidents to or from collisions between trains; the deaths of the remaining 109 passengers killed, and injuries to 936 were due to other causes. Of the remainder, 553 killed and 2,576 injured were officers or servants of the railway companies, or of contractors; 441 persons killed and 286 injured were trespassers, suicides, and others who met with accidents at level-crossings or from miscellaneous causes. In addition to the above, the companies returned forty-two persons killed and 4,367 injured from accidents on their premises.

On November 1st the Pullman drawing-room and dining cars on the Midland Railway became the property of the company, and first-class passengers were allowed to use them without extra charge. The Midland is one of the most progressive, perhaps *the* most, of our railways. It was the first to run a penny a mile carriages on every train, and to abolish the second-class. Now that no extra charge is made for the use of the dining and sleeping cars, except, of course, for viands consumed, the only distinction of passengers is that between the first-class and cheap-rate passengers.

I am wondering whether you wide-awake American folks have taken due notice of the compound locomotive exhibited at the Amsterdam exhibition by Mr. F. Schichau, of Elbing. It seems that this ingenious gentleman has built compound locomotives for some years past. About two engines, built in 1880 for the Hanoverian Staats Railway, from the designs of Herr von Borries, the direction of that line expressed itself very favorably in January, 1881, stating that while in other respects they had given equal satisfaction to ordinary engines, in point of fuel a saving of 16.5 per cent. had been proved by careful comparison with other new non-compound locomotives of equal power and doing similar service. Two more built soon afterwards for the Royal Ostbahn, from Mr. Schichau's own designs, also met with a very favorable reception, and one of these was tried on two different lines against an engine of approximately equal power, when a saving in fuel in one case of 13.4 per cent. and in the other of 18.9 per cent. was found in favor of the compound system. The absolute coal consumption for the compound locomotive per mile on these trips was 15.6 pound in the former, and 13.4 pound in the latter case. These results in the saving of fuel, having been achieved, the wonder is that more has not been said and done with regard to the merits of the compound locomotive.

Speaking of the Board of Trade just now, and of cheap trains on the Midland, reminded me that that useful department of the government has addressed a circular to the principal railway companies, asking for information in reply to the following questions: 1. What accommodation is now provided by your company for passengers at fares not exceeding one penny a mile, and what accommodation is given by it in the shape of workmen's trains? 2. What workmen's trains are provided upon the railway, the stations between which they run, the length of the journeys, the hours of starting and returning, and the charges made; also the statutory obligations of the company (if any) with regard to workmen's trains. It should also be stated whether the accommodation provided in the carriages is such as to comply in each particular with the requirements hitherto made for parliamentary trains? 3. Whether your company propose to make any and what additions to or alterations in the accommodation thus given to passengers at or under 1*d.* a mile, or to workmen?

An ingenious Gaul is out with a proposal which, if ever carried out, (?) will make your boasted Brooklyn Bridge but a baby in the comparison, His conception is that of a railway bridge across the English Channel between Folkestone and Cape Grisnez. The plan provides for a series of bridges constructed on varying principles, so as to allow for the passage at certain points of vessels with the tallest masts, while, of course, preserving as nearly as possible a level road for the line. The center supports are designed to rest on the Varne and Colbart Rocks, the former serving also as a basis for a solid pier surmounted by a hotel. M. Verard de Sainte-Anne professes to have made the most careful soundings, and is convinced that the Channel bed affords a firm basis for the numerous piers, about thirty in all, necessary to support his main structure, He estimates that the mail train would take about an hour and thirty-five minutes in passing over the bridge.

Mr. Holroyd Smith has made public his new system of electric tramways. To insure safety to the public, protection of the electric force and tractive efficiency, he proposes the employment of a central channel to contain the wires or bands conveying the electric force, and effecting the haulage by means of a large wheel with a broad face running upon the surface of that channel. As regards the practical results obtained, the inventor says that though it is as much as three men can do to push his empty car, which, with dynamo and gear weighs sixteen cwt., up a steep hill, yet the electricity has been so collected and used as to run it up at a moderate speed with six adults in the car—total weight, say twenty-four cwt.

H. A. L.

*** If the names and address of persons likely to be interested in the AMERICAN RAILROAD JOURNAL are sent to us, specimen copies will be mailed them free. The sending to us of such names will be considered a favor. Our circulation has been largely increased by such thoughtfulness on the part of subscribers, and we ask a continuance of it.

Tramway.

[*The English nomenclature of "Tramway" is adopted in this department as being of greater convenience and more specific in its meaning than "street railway," though in alluding to individual organizations we shall preserve their corporate titles. It is our hope to nationalize the term Tramway, which is now generally used in every English-speaking territory with the exception of the United States.*]

American Street Railway Association.

President.—William H. Hazzard, Brooklyn, N. Y.
First Vice-President.—James K. Lake, Chicago, Ill.
Second Vice-President.—George B. Kerper, Cincinnati, O.
Third Vice-President.—D. F. Longstreet, Providence, R. I.
Secretary and Treasurer.—William J. Richardson, Brooklyn, N. Y.

A STEADY increase in the number of street car companies subscribing to the JOURNAL, is the best evidence that the enterprise exhibited in the editorial management of this department, is appreciated by those who are the best qualified to judge of it. Proportional improvement will be continued, with the augmentation of encouragement and consequent strength received, an assurance unnecessary to be made to those who have watched with interest the development of matter under the caption "Tramway," from its very modest beginning to its present proportions.

A CINCINNATI street car company has given eleven conductors, who have acted as such for one year, one hundred dollars each as a reward for faithful and efficient services, in accordance with a contract made between them and the company. There is no deviation in the contract named from the sound principle that money should be earned before paid. At the same time, its leading peculiarity commends it to the consideration of employers of labor. Hope and expectation are powerful inducements to diligence, and if a portion of wages takes, more or less, the form of reward, there is something gained in the pleasant relations established between those who labor and those who pay.

THE cars of the Third Avenue street railroad of this city are warmed by stoves occupying about the space of one seat. While we fail to see that these are either a troublesome or dangerous innovation, we cheerfully recognize the additional comfort attending their use. They occupy the same position as that of the stoves used on at least one line in Brooklyn, half way between the front and back entrance to the cars. In the absence of a better device than the use of stoves for warming street cars, we, as occasional passenger, are thankful for that which is.

AN article on the painting of street cars in this issue is one of a series which, we are sure, will prove both interesting and valuable.

A Reply to Mr. John Stephenson.

THE following letter in reply to a statement made through our columns, by Mr. John Stephenson, gives facts which are valuable in a discussion of increasing interest and practical importance.

SAN FRANCISCO, NOV. 1st, 1883.

Editor American Railroad Journal:

In your September number I notice the opinion of a veteran, Mr. John Stephenson, as to the motive power on tramways, in which he says: "Yet it is not at all demonstrated that even the cable system can be economically operated in any instance in comparison with horse power."

Mr. Stephenson cannot be aware of what is being done in San Francisco or Chicago, or he certainly would not have made quite so wholesale a declaration. The Sutter Street Railroad Company changed their system from horse to cable, and stated before the Court, their saving to be not less than thirty per cent. by the change; and the Market Street Cable Railway Company have just converted a horse road to the cable system, at a cost of over two millions of dollars, after an experience of ten years of horse roads, and five years' experience of the cable system as applied to the California street railroad; all three of these roads being in this city.

Yours truly,

W. W. HANSCOM.

Painting Street Cars.

BY A VETERAN.

I.

THE painting of a street car is, in many respects, a particular branch of industry. The painter who can successfully accomplish a job of carriage painting, may think himself competent to paint a car; but he finds when put upon this class of work that he has much to learn, although the manipulation of the brush and the general order of the coatings are similar, there is yet a vast difference in the two trades, and that he must become acquainted with peculiar methods or modes of procedure before he is an expert at car painting. On the other hand, the painter of a Pullman palace car will find that the methods employed in a street-car paint-shop are far below the standard he has been brought up to; while the ordinary passenger of a "tramway" (using an English phrase) is unaware of the variety of talent which is brought to bear upon the work on which his eye rests as he journeys along behind a pair of horses in a public vehicle of the kind now in course of remark. The street-car does not come up to the elegant steam car or "coach" of our railways, and there are but few who can appreciate the difference; but in an experience of several years, the writer holds the opinion that there is much to be learned by both the carriage-painter and the palace-car painter, from what may be said to be an intermediate profession. It is therefore my intention, in this article, to describe how the painting of a street-car is done, that he who may be called upon to do such work may carry it through to a successful issue.

The *priming* of any vehicle demands the greatest care, and many are the opinions held by painters regarding this particular point.

The "old masters,"—if such they may be called,—depended almost entirely upon white lead and oil for a priming paint to form the foundation for their color, ornamentation and varnish. And, certainly, we must accord credit to them for judgment regarding durability; for a piece of wood well filled with oil and lead is, as most of us know, made as durable as by any known method; but in the filling of the wood with the materials named, much *time* will be consumed, much labor expended (for one coat will not be sufficient), and much trouble and expense fol-

low in the perfect carrying out of the work. In our younger days, we knew no other plan of operation than the repeated coatings of lead and oil. Let us see what theory and common sense have done for us?

We knew that in order to make a solid foundation, that the pores of the wood must be filled to prevent the absorption of the liquids in the color, and of the varnish applied over it, and we therefore put on coat after coat of *lead and oil*, the first coat being nearly all absorbed; the second partially so; and the third, oxidizing upon the surface, our purpose was accomplished; but with what an amount of time! Forty-eight hours between coats was scarcely sufficient, and in order to have the paint dry hard, more time was given, often as much as a week, so that sometimes three weeks were allowed for the application of the three or four foundation coats of paint, which in a small establishment caused a crowding of work; the shop was filled at all times with work going through the several stages of drying and hardening, and the attendant expense was what we might now call *enormous*.

A lessening of time or of the coatings brought sudden decay, and our reputation as painters of durable work suffered at the hands of railway superintendents. At length another plan was adopted: instead of employing several coats of paint, *plastering* was resorted to. That is, the priming of oil and lead being on, the job was "smoothed over" with thick paint or putty, with a broad-bladed knife, so that the several coats were not needed to produce a foundation. This, of course, shortened the time of painting, up to the leveling down of roughstuff (which was then thought necessary), but with that speed which was demanded, by lack of room for storage, etc., the *plastering* was a poor subterfuge, and we looked around for a better plan. Liquid primings were now presented to the trade and received with pleasure, in some cases, and with fear in others, and when this means of shortening time was at hand, the business of the car-painter began to improve. The pores of the wood could, by a single coating, be permanently sealed up against moisture, and the foundation for leveling coats be at once obtained.

The priming of a car does not only include the exterior, but the interior as well, for if the interior is to be finished in varnish, as is the usual way, the desire will be to keep the varnish from "striking in," causing the application of several coats, and the liquid priming will form a solid foundation.

Having now given the particular points of advantage with the priming, we will describe the manner of its use for, unlike ordinary paint, it is not simply laid on with a brush. The car being well cleaned by the wood-worker of glue, raised grain, etc., a good dusting off is all that is necessary to make it ready for the first coat or priming. Pouring the priming material from the can into a convenient sized cup, with a stiff bristle brush the wood and iron is coated, as in painting, but the material is put on more sparingly and well rubbed with the brush. When a portion of the work has thus been gone over, soft rags are used to wipe over every part, thus driving the priming into the wood, and removing all that is not readily absorbed, for it is unlike paint, and if any particular amount is left upon the surface, it would be a long time in drying. Every part of the car being coated and rubbed over as stated above, forty-eight hours are given for drying, at the expiration of which time the outside may be coated with roughstuff, no sanding off or other preparation being necessary, but the first coat of roughstuff should have a trifle more oil in it than ordinarily given, after which two coats of roughstuff as usually mixed (providing the ready-prepared article is not used), may be applied, one coat each day. If it is not necessary (owing to price obtained,) to roughstuff the panels, one good coat of white-lead and oil will suffice to form a foundation for color, and on this the puttying, etc., may be done.

There are a vast number of street-cars painted as above—without roughstuff—and the durability of such work seems to be all that can be asked for. Those which are roughstuffed and rubbed being a little smoother only.

The coloring of a car demands attention in that no more paint be spread on than is necessary to give a solid color, for it is a well known fact that the least paint to form a solid ground is best where varnish is used over it, for thick coatings of paint absorb the life of the varnish, *i. e.* the oil, and sudden decay follows. Vermilion is a good panel color, but it must be mixed and applied in a certain manner to prevent its turning to a dark Indian red shade. A white ground is considered best for vermilion, and the dry pigment should be mixed with quick drying varnish and turpentine, so as to dry rapidly; japan, as a general thing, is too dark for this delicate color, and gives it a muddy appearance.

There are several brands of vermilion, and many prefer the cheaper grades to the English vermilion, which has ever proved best. Tieman's California vermilion was used for several years on the street-cars of the Third Avenue line in New York, and it gave general satisfaction; but as a rule, no dependence can be placed on any but the pure English red. Lakes are now mostly out of use, the plan of producing such colors being to first make a red ground, light or dark, then glaze with carmine, which gives any desired shade, and makes a far more durable job.

Yellow, green, blue and umber shades are in demand for this work, and when neatly striped and lettered in harmonious colors, they are good, but in nine cases out of ten the colors chosen are inharmonious, and yet the painter is not to blame. Where several cars are to be built for a road which has not already a distinctive color, the painter is directed to paint portions of a car in various colors so that the president, directors or superintendent of the road may examine and choose therefrom. And these individuals, often with no taste or knowledge of the combination of colors, direct that color or arrangement of colors, which to an educated eye is abominable, and in many cases directly opposed to the rules laid down by Chevreul the great French authority on the harmonious blending of colors.

This may be one of the things which cannot be avoided, yet the painter may sometimes modify a poor combination so as to improve it.

There is a variety of opinion regarding the kind of brush best adapted for laying color, some preferring a bristle brush, others a badger-hair, and others yet a camel's-hair blender. Now they are all good in their places, and the writer has often found it convenient to use them as follows: The bristle brush for white-lead and colors made principally with it; a badger-hair brush for vermilion; and camel's-hair brushes for other fine colors. The last named brush will lay the color thinner, more even-

ly, and economically than any other, but for heavy colors it is not so well adapted. The black used for moldings, etc., need not be the best ivory black, it is unnecessary; one of the inferior grades such as royal black, or even lampblack, for the difference in color upon so large a job, and that only upon moldings, is almost imperceptible. The black used for the dash-rail, brake-rods, window-guards, etc., should be a hard drying black japan.

The trucks of a car receive but little care in painting, for they are generally well covered with street mud, and a good coating of metallic paint and oil is all they require, but the outer face of the pedestals should be as well painted as the body.

The interior of street-cars being well primed with the light shade wood filling, all that is necessary is to give it a good rubbing over with fine sandpaper to prepare it for varnishing. "Inside rubbing varnish" will dry in from twenty-four to thirty-six hours, sufficiently hard for rubbing with pumice stone, when a second coat may be applied, and this, when dry and rubbed, will form as solid a foundation for a flowing coat of "inside finishing varnish" as is desirable on this class of work.

The outside of the car being colored, color-and-varnished, and mossed or rubbed off, is ready for striping, lettering and ornamenting. The styles of striping on cars has not changed materially in several years, although several lines have adopted the Eastlake or Japanese ornamentation, and when once a style is agreed upon there is seldom any change made. The lettering, however, will be found far different on many lines from that employed a few years ago, and this is due in a measure to the influx of sign writers to the car and wagon letterer's trade. Where a bold-face letter, well defined or balanced was once the style, we now see plain and fancy Roman, or what is worse, some such arabesque figures as shown in the line below.

What to Do.

These styles of lettering, although they may be pleasing to some eyes, should never be painted upon the sides of a public vehicle, for there are many who cannot possibly decipher them. A plain half-block or full-block letter is always readable, and should be employed.

A Comparison Between English and American Street Railroad Construction.

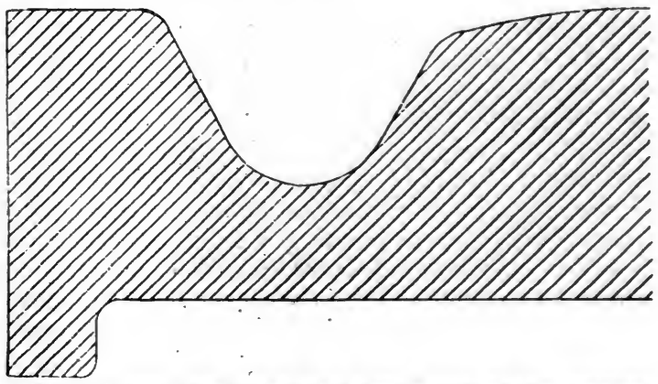
It is impossible to deal with the tramway system of England without either encroaching upon the information supplied by Mr. D. K. Clarke in his excellent treatise upon the subject, or borrowing therefrom. Before dealing with the matter, we must therefore refer to this source much of what follows.

When it is remembered that the English system does not compare in mileage with that of this country, we are at first disposed to anticipate that there is not much to be learned from the smaller system. As will be seen, this is far from being the case. The more crowded population available as passengers, together with the large amount of capital always at the disposal of a safe investment at a reasonable interest, have combined to secure in England a class of construction which for permanency is not excelled, if equaled elsewhere. The natural conservatism of the country will largely explain the more gradual growth of the system, as compared with its growth here.

In England, tramways are jealously hedged around with provisions against the slightest interference with the passage-way of the streets.

It is known that the step rail has never found favor there. The little that was used was quickly taken up. The conditions that have made the step or tram-rail a necessity in this country, viz.: the indifferent, if not bad condition in which the streets are kept up, do not exist there, where the streets are kept in almost perfect condition.

This form of rail gave way to one, the top surface of which was level with the street, and in which the passage of the wheel flanges was provided for by a groove. See illustration.



The rail here shown was laid very much as the present tram is laid in this country. Cross-ties were laid; on these were placed longitudinal stringers to which the rail was spiked. The stringers were braced against the ties by the use of cast iron brackets.

And herein lays the fact which has prompted the following discussion—where England *commenced*, we *remain*.

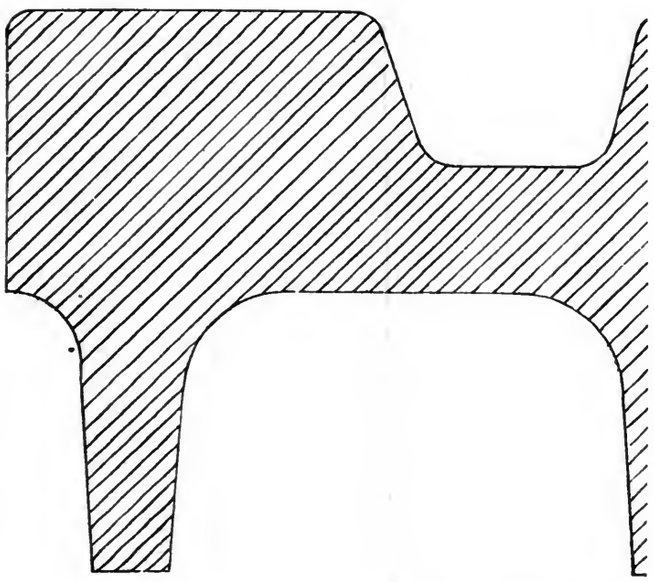
Beyond the fact that in England, concrete was and is almost universally used in preparing the foundation for a track, which is not the case here, the connection between the tracks and road-bed is about the same; so much so, that we will deal entirely with the track.

The first step as an improvement upon the construction noted, was an effort to improve and strengthen the joints. That these are defective, is generally admitted in this country, but few realize how costly the defect. It is well to touch on this point. It is a fact that the amount of wear obtained from a rail in the tram system does not compare with that obtained from a rail of the same material in the steam railroad system. In the latter, a T rail of steel will sustain the traffic of from seventy to one hundred million tons, at an average speed of say thirty-five miles an hour for passenger, and twelve miles an hour for freight traffic. A good quality of iron will, under similar conditions, sustain a traffic of forty-eight millions of tons. Reducing this to weights and speeds current in street railroad practice, and allowing for an excessive street traffic, it will be found that a tram-rail of iron, to say nothing of steel, should last very much longer than it does. It is well known to every street railroad man that

excessive wear destroys the ends long before the rest of the rail is worn out. During the writer's experience as a manufacturer, he worked up many hundred tons of condemned tram-rails. It would be no exaggeration to say that of those which came under his notice, the lease of life had been cut short at least twenty per cent. by these defective ends. It is not alone a question of wear at the ends themselves, but that the wear started here extends imperceptibly to the rest of the rail and accelerates its destruction.

The introduction of steel is of comparatively recent date. Sufficient time has not yet elapsed to have worn out many of the steel rails in use. But even in steel the problem is the same. It is only a question of degree. It can be noted by anyone who will carefully examine some of the steel center-bearing rails in use in New York City, that at the joints, the destruction we speak of has already commenced. A straight edge laid on the head of the rail will show that the wear here has been much greater than on the rest of the rail. Whereas it is still more noticeable at the side flanges, in extreme cases they having almost worn through; in one case, by actual measurement, not over ⅜ of an inch being left.

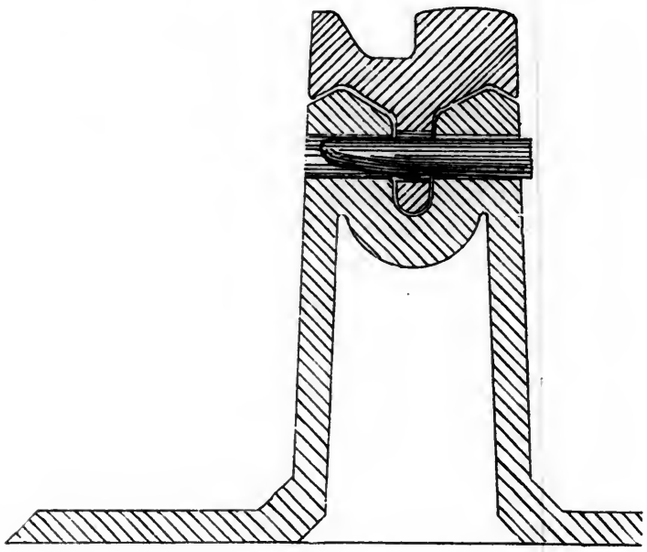
It is not a matter of surprise, then, that this should have been the first defect attacked. An early effort seems to have been made by the substitution of a bolt for the spike. The bolt ran through the stringer to a capacious washer of varying form underneath. While an improvement so long as the stringer remained sound, this method became useless thereafter. The more perfect fastening of the rail at the ends seems to have brought to light the real cause of the bad joints, viz.: the flexible nature of the flat rail; for we find the next step was to make the rail itself more rigid by the use of two projections attached to the base of the rail as stiffeners. See illustration.



The rail thus shown was spiked to the stringer as usual, but a further support was given to the joints by staple spikes, which went through the projection into the stringer sideways.

It is clear that the distribution of metal is here wasteful. A rectangular beam varies in stiffness directly as the breadth, but as the square of the depth. Had the same weight of material been added in the form of one central projection, as in the web of a T rail, the increase of stiffness would have been over twice as great. Or, which amounts to the same thing, a smaller amount of metal thus disposed, would have given the same increase of stiffness. Hence we are led to the next step, which was the change here outlined as advisable.

The greater stiffness thus obtained, together with the simple form of construction, paved the way for the displacement of the timber stringer. The rail was supported on iron chairs placed at regular intervals, and held down to same by a key. See illustration.

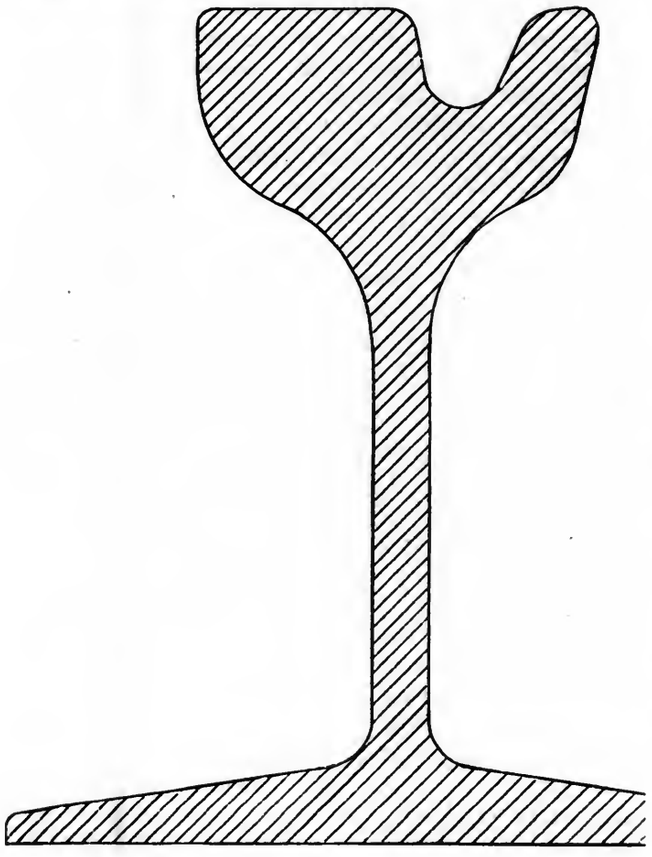


The transition to this type was quickly effected. In fact, the advantage of the change seems to have been at once perceptible. At this point, a halt seems to have been made, and modifications of the same general type seem to have been the tendency. It is natural that with the displacement of the timber stringer, a pause of satisfaction should have occurred. The achievement merited a rest.

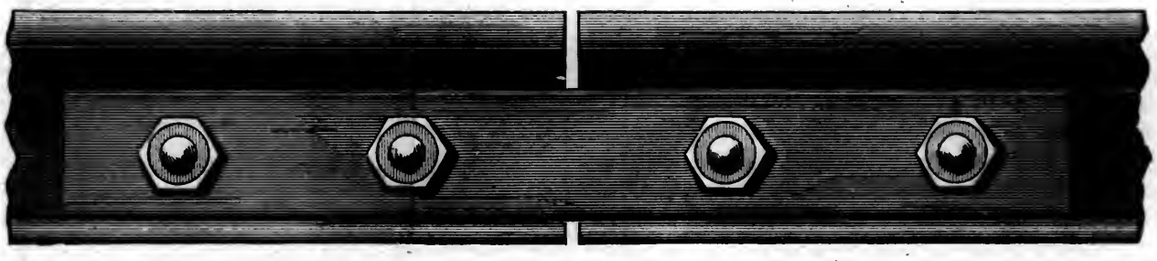
Continuing our analysis, the main defect in the type of rail now before us seems to be the use of the key as a fastening. It may be accepted as a rule that no rail fastening which depends upon a key, is trustworthy. It is not so much a question of strength, as of resistance to impact or concussion. Even where such joints are machine-fitted, they are liable to work loose; still more so if contact with rough castings is depended upon. Even with the greatest care in moulding to produce a smooth surface, some minute projections or roughness will remain. These bind the key on its being driven home, and let it be driven in ever so hard, appearing firm and immovable, its becoming loose is a question of a very short time. The proper fitting of a key or wedge is one of the most difficult tasks of the mechanic. So we often find the use of hard wood urged as a key, or, as an alternative, the use of a smaller key driven into a wood filling. Such a fastening is utterly unreliable, owing to shrinkage and decay of the wood. It was the writer's task, for some years, to care for massive machinery, in which heavy gear wheels were fastened to their center by this means, and he "speaks out of the fullness of the heart" on this subject.

We are not surprised, then, when we are brought to the

form of rail which is now the accepted type of a modern street rail. See illustration.



In it the joint can be effected by the splice-bar or fish-plate, as in the steam railroad system, which form is to-day accepted by all parties as being the best in use.



In this rail the height varies from seven to eight inches, the base is thrown below the surrounding paving sets, and is broad enough to support same. The rails are laid directly on cross ties, and spiked thereto. The good points of this style of rail are at once evident.

With perfect joints, a rigid and smooth running track, and no stringers, ultimate economy seems assured, even regardless of first cost. Indeed the saving effected yearly, and the long life of such a track, must justify a large first expenditure. That such a rail is more costly to make, and, therefore, higher priced, regardless of the extra weight, stands to reason. In fact it is upon record that in some cases the groove was planed out in the machine shop, the cost of which can be imagined. It is now made by bending upward the side flange after rolling the rail. Among other advantages is the greater comfort to the passengers of such a track. The writer remembers noting this while riding on a small suburban tramway running to Briton Ferry, in South Wales. It is no small point. Granting two competing lines, one laid with such a rail and the other with the present tram, there can be no question that the smoother track would draw travel from the other line. Mr. D. C. Clarke seems to have condensed the whole problem in the following words: "It is apparent that a first rate rolling surface is of the essence of a tramway, and it is not well to study too closely the mere element of first cost, in the amount of which for efficient systems of tramway, the variation is not of very considerable importance. Nor is there much difference in the cost of maintenance, from three to six per cent. of the total working expenditures. The practical value of a good rolling surface on the other hand *can scarcely be overestimated*; for the running and car expenses are influenced to a very great extent by the condition of the surface, and *they* (the running and car expenses) constitute nearly *two-thirds* of the total working expenses."

To put it otherwise, the one is an *investment*, the other a *yearly expense*. Having thus briefly outlined the development of the English system, and conceding, as we must, its advance over our own, the question occurs, "why this difference?" We think the answer can be found in the fact that in America the tramway waits on the population, and therefore commences under circumstances necessitating the greatest economy in first construction. In England, the population awaits the tramway, and therefore a perfect system, almost regardless of first cost, is justified from the beginning. It is, however, the fact that in some of our oldest and most thickly populated cities the condition exists almost as in England, and, so far as these points are concerned, there must be found some other causes. There can be but two.

First. A conservatism averse to change.

Second. The failure to realize the real economy belonging to a more perfect track in the *yearly* saving in running expenses.

Let us look a moment at this. Take the one question of cars alone. A line, say five miles long, is running under a 2½ minute headway. It has thirty cars en route at an average speed of four miles an hour as a minimum, calling for a plant of say fifty cars, with reserves. Taking eight years as an average life, this represents an annual cost of $1,250 per year per mile. Judging from personal observation of the difference between English and American practice, and remembering that it is not customary here to carry outside passengers as in England, we think that it would be reasonable to add at least one-half to the life of the cars for the more perfect track. If so, this would effect a yearly saving of $417 per mile, regardless of the yearly repairs put upon the cars. Of course such an estimate can only be a mere guide in the matter, but it at least indicates that the question has a value.

The question of track construction, however, is not to

be dwelt upon in its bearings upon lines of this class, but rather upon that class to whom first low cost is imperative, by far the largest class. Before the English system can be adapted to American use, its first cost must be decreased.

The problem seems to admit of solution. As with this type of rail the track consists only of the rail, we will deal entirely with that.

For reasons already given we must retain the tram or step form for the head. Municipal regulations enforce generally a width of about five inches. This first point in the problem is settled for us.

Next we will look at the base. We think the width of this can be decreased. In England it supports the adjacent pavement. There this is both necessary and advisable. Necessary, because the head being narrow and flush with the street, most of the street traffic adjoining the track runs on this part of the paving; and advisable, because the rest of the street is kept in such thorough repair that a full measure of support can be depended upon from it. Here neither of these conditions exist. The step rail provides a passage way for the wagons. And the argument that sanctions this seems to us a wise one. The traffic has to be provided for in either case. How shall we provide for it? Give it a steel way or let it run on the roadway. Steel will long outwear the most perfect roadway, and, therefore, seems to us the cheapest thing to use. Those who complain of the rapid wear of their rails by the street traffic do not think how much more rapid would have been the wear of the adjacent street if such had supported this traffic, as it otherwise would, and how much more costly the maintenance thereof would have been. So, providing for this traffic on the rail, we need not provide for it again on the adjacent road bed. It is true, paving here should be good under all circumstances, but the special provision we are dealing with is not also necessary.

Neither does the second condition exist. Here the repair of the streets is not as perfect as in England, and no matter what means be adopted to protect the road-bed adjacent to the rail, the support of the rest of the road-bed is not to be looked for here to the same extent as in England.

American practice demands that the street shall support the rail, not the rail the street.

We will assume then that we can reduce this base, say to three inches width. There now remains the question of height.

In this are two points to be considered. First we want ample stiffness; and, second, where paving sets or blocks are used, we want the cross-ties thrown below the same.

As to the first consideration, we have two known elements in the case. A head of a given form, five inches wide, and a base of a given form, three inches wide. We add to this the vertical stem or web, making it a girder. With a total height of 4½ inches we secure a stiffness that is three times as great as that of a 45 lb. tram-rail laid down on a 5x9 stringer. So far as stiffness is concerned this suffices. Considering the second point, that of throwing down the cross-ties, there are only two means before us. The use of the 4½ inch rail, with an iron chair between it and the cross-tie, or the deepening of the rail itself, as in the English system. Mechanically both will answer. It then becommes a commercial question. We find that by using the chair we can secure our object by the use of 7¼ tons of material to the mile. If we do so by deepening the rail, we use thirty-six tons of material per mile. On the score of economy there can be no question between the two.

The question arises as to the stability of the proposed rail. The strain that impact would induce is torsional, the tendency would be to twist. If a doubt arises upon the question of its stability it will be at once removed by ascertaining the power required to effect such twisting, particularly when the continuous nature of such a track is considered.

Taking now the reduction in weight outlined herein, and considering that against the greater cost of such a rail must be offset a large saving in lumber, and greater saving in the cost of labor in construction, it seems feasible to bring the cost of such a track within the reach of American practice.

And, as before stated, once rendered feasible in the first construction, the permanent yearly saving is a point that should not be lost sight of. The whole benefit of having brought down the first cost, will consist in rendering this yearly saving available to those who could not otherwise secure it.

In operating a street railroad, the question of construction is one that occurs only every sixteen or eighteen years with a given track; whereas the operating expenses, such as collection of fares, feed of stock, time of transit, etc., are those which affect the financial results every year. So long as the question of track is considered purely from the standpoint of first cost, it becomes a fact that so small an article as a register or conductor's punch is, and is properly, a more important question to the street railroad man. If the discussion of the matter has demonstrated that the problem is one that deserves to be classed with that of the article mentioned, it will have achieved its purpose. We think to properly consider it, it becomes both a question of first cost and permanent saving. It cannot become the latter until it has reduced the former.

The Street Railroad Problem.

SAN FRANCISCO, October 6, 1883.

Editor American Railroad Journal:

In the article on "the Street Railroad Problem" in your issue of August, after enumerating the various means of street car propulsion, and making some reference to the trials of various plans, you allude kindly to the cable system, and pertinently ask why, after ten years of use, the cable system is so far from being generally adopted by tramway companies. It is natural, I believe, for corporations to be rather conservative in regard to the expenditure of large sums of money in any, to them, untried experiment, and especially when the cost of an experiment is much greater than the original capital of the company or organization. This applies more particularly to railway corporations perhaps than to any other. They have to consider, not only an increased revenue or a decreased expense account, but the regularity and positiveness with which their particular business is transacted, and that is the carrying of passengers and freight. Let some one approach a railway company with a proposition to reduce the cost of carriage or the operating expenses 10, 15 or 30 per cent., and although it will have attention and careful

examination, the trial question of importance is, what is the liability of this new arrangement to interfere with the prompt despatch of trains, or what chances are there that trains may be delayed en route? If this bears an appreciable percentage against regular despatch, it is a fatal objection. But let it be demonstrated that with other advantages more regular despatch can be had, more promptness in arrival and departure, greater capacity over the same length of road and a reduced cost of operating expenses, then will the cost of an experiment be a small factor. It is well known that a vast number of inventions relating to railways are patented already, and a great number patented each year, and yet but few of them come into general use. It is only after years of experiment and trial and struggle with the varying conditions, that the most meritorious and important gradually become known, adopted and appreciated. And in this position stands the cable system for tramways. Nearly forty years ago this system was patented, but the engineer was too far ahead of his time, and again was it patented twenty-five years ago. Even that was too soon, for the opportune moment had not arrived, and did not arrive until the star of empire marched Westward from the Atlantic to the Pacific and brought to the golden West the ambition and energy and knowledge and skill of all the world, with men who never admitted the word fail in any enterprise, and whose independence of thought and action made them free from the trammels of older associations. A suggestion was no sooner made than minds at once instinctively turned to the solution of any problem. And when our city of San Francisco had grown so that the homes of its people were North and South, in the valleys and were pressing up and over the hills to the West, and tramways were constructed to take people from one end of the city to the other, some of which had to pass grades perhaps steeper than in any other city would have been considered practicable, the natural humanity of man came forth for the protection to animals, and a suggestion that some plan could be studied up that would relieve them from the cruelty, evolved the construction of the Clay Street Hill Railroad. This modest and unpretentious beginning was but the dawn of a new era in tramway propulsion, for since then other roads have either been converted or newly constructed, and are now operating to the extent of about fifty miles, and Chicago has taken the initiative East of the Rocky Mountains, and it is hoped that with the commencement in Philadelphia, the system will be extended to the far East.

The writer having been connected with the cable tramways of San Francisco for the past six years and over, has made a study of this plan of propulsion, and it needs no extravagant assertions to make it a matter of great interest to tramway companies, for if all the disadvantages of this system could be shown side by side with its advantages, the latter would preponderate to such an extent that the former would seem insignificant; and as an earnest advocate of its adaptableness to many localities, the writer is desirous that a knowledge of this system of propulsion should be disseminated. The general or popular idea seems to be that the system is intricate and that there is something mysterious about it; but it is not so, perhaps not half so difficult as was the unsolved problem of hauling a train of cars by a locomotive that had smooth drivers and no teeth along the rail to keep the wheels from slipping. While the general features of the system are applicable to any localities requiring this means of propulsion, modifications of the details are needed to meet the changing conditions of streets, roads, climate, traffic, etc. The streets in San Francisco are hilly; in Chicago, level, but both straight. In New York and other places East, as well as Chicago, snows and ice are prevalent, while the temperature is mild in San Francisco. In London, where the writer was engaged in designing the plans for the Highgate Hill Tramway, the streets are mostly all crooked, and that with other local conditions varied so much from San Francisco that scarcely one of the details in the latter place was suited to the road in London. In order that a road or cable tramway may be constructed in any desired locality, it is proper that all the conditions which occur in that locality should be known, and must be known, before an engineer undertakes to lay down plans for the construction of such a road. The one great object to be attained is the running of a rope and having a grip attached to a car so that the rope can be attached to the grip and yet travel in the tube underground without coming in contact with any of the sheaves necessary for supporting the rope, and diverting it to such directions as may be necessary to suit the direction of the street above. A tube for the rope to travel in can be constructed of any desired dimensions, with a slot in the top, the strength of the tube can be made to meet any possible requirements, and car tracks can be run above ground in any direction.

Various facts have come to light during the experience of cable tramway propulsion in San Francisco and Chicago, and such of these as may be of interest, I will add in another letter.

W. W. HANSCOM.

Fowler's Improved Safety Fare-Receiving Box.

Robberies of fare-receiving boxes, by petty pilferers, through the aid of flexible rods and other similar devices, known to the craft, have given rise to such an unvarying and incessant complaint, on the part of persons and corporations employing them, on railways, tramways, in omnibuses, etc., that the skill of the inventor has been invoked with a view to interposing an impediment, and providing an effectual check to this constant outgoing flow; and many and very expensive devices and methods have been contrived, designed and suggested, apparently without success. Among the best of the many devices and suggestions, are those boxes having internally arranged directing plates, set inclining downward toward the safe, at diverging angles, and alternately on opposite sides, but these, (owing to the fact that they present a plain surface) instead of proving wholly efficacious have



been utilized by the thief to aid him in directing his wire, flexible rod or other aid on to the money, until the users of the box come to think it is almost impossible to put a stop to the robberies. This however, Mr. T. W. Fowler of Washington, D. C., has effectually done by his patent, partially shown by the accompanying cut.

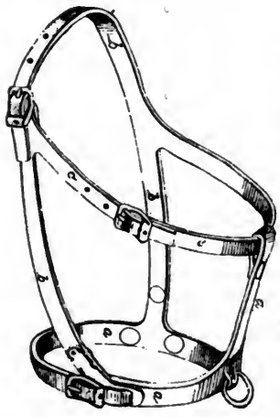
Instead of the plain directing plates, as now in use, Mr. Fowler introduces into the fare-receiving box, one, two or more foraminous (perforated) directing plates, secured by one end and the sides, on the inside of the box, on the opposite sides thereof, the free ends of the plates directed downward, toward the opposite side of the box, so that the plates will stand at diverging angles from each other.

These plates may be made of any character of material, and the entire surface is so perforated with slots or other forms of holes, that a wire or rod, that could be bent in any shape to pass over the end of the plate, would pass down through the foramina, so that even if it could be directed on to a fare, or money, in being withdrawn it would be wholly stripped, and then the line of perforations at the lower end of the plate are carried out into slots, so as to form numerous fingers on the lower edge of the plate, over which it would be utterly impossible to carry a wire with anything on it.

The upper plate, if preferred, may be made integral with the fare-receiving mouth, but this is not necessary.

The great advantages presented by this patent are, its extreme simplicity, its cheapness, and the facility by which it can be introduced into any of the fare-receiving boxes now in use. These plates can be cast of glass, stamped out by machinery, or cast of any character of metal, and at a very trifling expense.

An Improved Halter.



THE Triumph Halter, patented by R. H. Armstrong, of Hudson, Michigan, July 24th, 1883, Patent No. 281,952, is made of one piece of leather, without a stitch, making it stronger than a sewed halter, an advantage well known to horsemen.

The straps are cut with the grain of the leather, and parallel to each other. There is no scrap or waste leather made in cutting, With the aid of two small stay-plates, on the sides, it forms a perfect halter, with all the essential features of a five-ring halter, taking forty-two inches less leather to make it. It is adjustable to all sizes of heads.

The advantages claimed for this halter are the great saving of time in its construction, dispensing with sewing and rings, a great saving in leather, and that it is a stronger and better looking halter than any other.

For territory or shop rights the reader is referred to the inventor and patentee at Hudson, Lenawee Co., Mich.

THE horseshoe, invented and patented by Frank C. Rollins, of Weld, Maine, is so designed that the calk can be renewed easily without taking the shoe from the horse's foot. Its patentee's claim is the combination, with a horse-shoe having on its under side, at the front end, a transverse dovetailed recess, tapering or wedge-shaped in direction of its length, and having at its wide or front end a notch communicating with the nail-groove, in combination with the toe-calk having on its upper side a dovetailed wedge-shaped cleat extending at the front end, so as to form a point adapted to enter the notch in the dovetailed recess.

A NEW halter has been invented and patented by J. W. B. Carpenter, of West Medford, Massachusetts. It is made of coils of steel wire, providing a flexible action as near the restraint of the human arm as is perhaps feasible. When there is no pressure it is straight, and keeps the horse about two feet from the post, or wherever else he is fastened. Some are made covered with rubber, and so well adapted for use in bad weather. This unique invention is claimed to be the best thing of its kind, so far.

THE Third Avenue horse cars of this city carry neat little stoves, which stand in zinc-lined boxes of walnut and pine, set midway in one of the rows of seats. The stove occupies the space of an ordinary seat. On days when the fire is not lighted, passengers are said to find comfort in looking at the stove.

THE Prescott Manufacturing Co., of Boston, whose hangers for heavy doors are widely and favorably known, have perfected hangers for the doors of street cars, and a large number have already been ordered for some of the Boston street railroads.

List of Recent Patents for Inventions Relating to Tramways.

BEARING DATE OCTOBER 2, 1883.

285,814. FEED-BAG FOR HORSES: James H. Hey and Alois N. Verdin, Cincinnati, Ohio. Filed June 21, 1883.

285,976. REIN-HOLDER: Jos. K. Craig, Canton, Ohio. Filed Feb. 23, 1883.

286,004. HARNESS ATTACHMENT: Sylvester Hemphill, Belmont, Wis. Filed April 18, 1883.

286,010. COMBINED COLLAR AND HAME: Moses Humber, Calliope, Iowa. Filed March 7, 1883.

286,044. CABLE RAILWAY: William McCall and John V. De Vry, San Francisco, Cal. Filed Sept. 18, 1882.

286,163. GRIPPING AND CARRYING APPARATUS FOR CABLE RAILROADS: Henry Root, San Francisco, Cal. Filed Feb. 13, 1882.

BEARING DATE OCTOBER 9, 1883.

286,189. ADJUSTABLE TOE-WEIGHT FOR TROTTING HORSES: Cyrus H. Etter, Medford, Mass. Filed Aug. 3, 1883.

286,190. TOE-WEIGHT FOR HORSES: John H. Fenton, Chicago, Ill. Filed Jan. 2, 1883.

286,228. ENDLESS-CABLE GEARING: William B. Ross, Lyons, N. Y. Filed March 15, 1883.

286,257. STREET-CAR-DOOR MECHANISM: Fredk. B. Brownell, St. Louis, Mo. Filed July 31, 1882.

286,260. CHAFE-PAD FOR HARNESS: Charles W. Burgtorf, Petaluma, Cal. Filed May 17, 1883.

286,319. QUARTER-BOOT FOR HORSES: James G. Lightford and John H. Fenton, Chicago, Ill., assignors to said Fenton. Filed Sept. 18, 1882.

286,347. HARNESS-SADDLE: Samuel E. Tompkins, Newark, N. J. Filed Dec. 8, 1882.

286,349. PASSENGER-REGISTER: Louis A. Touchet, Cambridge, Mass. Filed July 17, 1883.

286,389. HORSESHOEING-STAND: Wiley D. Coffey, Pangburn, Ark. Filed July 12, 1883.
286,435. HARNESS-PAD: John Frederic Hessel, Champaign, Ill. Filed Jan. 20, 1883.

BEARING DATE OCTOBER 16, 1883.

286,602. HALTER: Albert G. Garfield, Chicago, Ill. Filed April 18, 1883.
286,640. HORSESHOE: Frank C. Rollins, Weld, Me. Filed Jan. 19, 1883.

BEARING DATE OCTOBER 23, 1883.

287,024. HORSESHOE: Thomas Head, Lowell, Mass. Filed Dec. 30, 1882.
287,031. REIN-HOLDER: William S. Laney, Baltimore, and Charles F. Yost, Canal Winchester, Ohio. Filed March 27, 1883.
287,094. STATION-INDICATOR: William W. Campbell, San Francisco, Cal. Filed Aug. 4, 1883.
287,125. TRACE-BUCKLE: Dickson T. Harbison, Duncanville, Ill. Filed March 15, 1883.
287,220. CONDUIT FOR TRACTION-ROPE RAILWAYS: Adolphus Bonzano, Phœnixville, Pa. Filed Sept. 24, 1883.
287,280. OVERSHOE FOR HORSES: Benjamin Greenaway, Louisville, Ky. Filed July 30, 1883.
287,341. HOSE-JUMPER: Wm. B. Thomas, Philadelphia, Pa. Filed July 2, 1883.
287,377. ENDLESS-CABLE GRIP, ETC.: Aiken Haman, San Francisco, Cal. Filed March 3, 1882.

BEARING DATE OCTOBER 30, 1883.

287,411. TRACK-CLEANER: John Birnbaum and John T. Richmond, Cincinnati, Ohio, assignors of one-third to George J. Birnbaum, same place. Filed Jan. 8, 1883.
287,497. RIM-PLATE FOR HORSE-COLLARS: William L. Bellis, Cleveland, Ohio. Filed Sept. 11, 1882.
287,577. CRIBBING-PLATE: August Quinque, Harleysville, Pa., assignor to himself and J. Reinhart Z. Keelor, same place. Filed Aug. 29, 1883.
287,644. SEAT FOR STREET-CARS: William Don, New York, assignor to William White, White Plains, N. Y. Filed July 12, 1883.

LITERARY NOTES.

No. 1, Vol. I., of the *Journal of Progress, Wood-Worker and Machinist* is the beginning of an experiment which we hope will prove a success. Its orignal contents are useful and interesting, and its selections well chosen and well edited. This "representative journal of the wood-working interests in all its branches" is neat and attractive in appearance. Its "unpretentious design of being useful, both to the manufacturers of wood-working machinery and the buyers thereof," is certainly accomplished in the initial number, and the *Journal of Progress*, which is destined to fill an important part among the industrial activities of the age, is every way worthy of the God speed with which we hail it. Philadelphia: Jno. H. Bentley, No. 922 Holly street.

"The Heart of the Continent," published by the Passenger Department of the Chicago, Burlington and Quincy Railroad, is an historical and descriptive treatise for business men, home seekers and tourists, of the advantages, resources and scenery of the Great West. It has more than sixty neatly printed pages, freely illustrated, is well written by a well-informed pen, and is quite a keepable little pamphlet.

A similar production is the "Landscape Wonders of the Western World," from the same enterprising department of an enterprising railroad. Such little books, albeit published for business purposes, have great value in spreading useful information, and giving substantial pabulum to that spirit of patriotism which all good Americans strongly feel. The pamphlet before us contains a large and well executed map, increasing both its beauty and utility.

The "Great Burlington Route," the transcontinental route of America, completes our present notices of the excellent advertising done by the C. B. & Q., in the way of announcements, by means of well skilled literary and art work, published in a pleasing form. Colored illustrations are a feature of this very pretty production.

The *Memory Manual*, by George Yule, lecturer on memory, gives for a small price, a system which, as used by himself, develops astonishing results. Naturally he has a poor memory, but by the association of ideas, after the plan invented by him, his capability of remembering dates, rows of figures, arbitrary arrangements of words, etc., is phenomenal. His interesting little work, which sells at a dollar a copy, is published by the author, care of William Knowles, No. 104 East Thirteenth street, New York.

"How to Build, Furnish and Decorate," is a work which is well conceived; treating of subjects interesting to readers of every social condition. Examining it closely as to its contents, we find it exceedingly satisfactory, what it undertakes to do, as stated in its title page and well-written preface, being carried out with exemplary conscientiousness. The owner of this singularly valuable work has, in its first part alone, elevations and plans of 126 houses, making 349 illustrations in all, accompanied with a carefully prepared description of each building. "Furniture and Decoration" is the title of the second part of the work, which is beautifully illustrated, and gives, among other things, a statement of the principles which underlie the effective and artistic treatment of interiors. Specific directions, covering a wide range, and of service to the reading public universally, are given in large and pleasant pages, and expressed in clear and graceful English. The tone and spirit of the work throughout are admirable, and equally as marked in its third and last department, that on "Barns and Outhouses," as in the earlier portions of the volume. In short, the book under review is a highly practical, sensible and satisfactory work, unique in its completeness, and wonderfully cheap at the price at which it is sold. New York: The Cöperative Building Plan Association, No. 24 Beekman street.

The Harlan & Hollingsworth Company, Wilmington, Del., is building a state coach and a sleeping car for the president of the Argentine republic in South America.

The Taunton Locomotive Works are at work night and day on a large order just received for the Union Pacific Railway.

A new passenger locomotive has just been furnished for the Eureka Springs Railway by the Rogers Locomotive Works of Paterson, N. J.

The Ohio Falls Car Company has a contract for a number of caboose cars for the Pennsylvania Company, and has commenced work upon them.

New Inventions.

TO INVENTORS.

THIS department of the JOURNAL is devoted to descriptions of new inventions applicable to railroads. We publish each month a list of the same, and invite each inventor to forward us a description of his invention, believing the publication of facts regarding them will be perused with interest by railroad men, and all interested in the development of our railroad system. *We make no charge for publishing these.*

Descriptive articles relating to Tramways will be placed in that department.

List of Patents for Inventions Relating to Railways, Machinery, Etc.

BEARING DATE OCTOBER 2, 1883.

285,787. CAR-COUPLING: William B. Bessey, Elmira, N. Y. Filed May 26, 1882.

285,789. CAR-COUPLING: Kirk S. Blanchard, Clarendon, N. Y. Filed Feb. 24, 1883.

285,798. INDICATOR AND ALARM FOR STEAM-BOILERS: Edward J. Coffin, Little Falls, N. Y. Filed Aug. 15, 1883.

285,812. REVERSING-GEAR FOR STEAM-ENGINES: Martin E. Hershey, Harrisburg, Pa. Filed Aug. 9, 1883.

285,813. CAR-COUPLING: Louis Herrman, Boston, Mass., assignor to Mary Herrman, same place. Filed July 2, 1883.

285,828. FUEL-MAGAZINE FOR STEAM-GENERATORS: George Mehring, Chicago, Ill. Filed July 2, 1883.

285,833. RAILWAY TIE AND STRINGER: John Newton, Clifford, Ind. Filed Feb. 23, 1883.

285,842. RAILWAY METALLIC CROSS-TIE AND TROUGH: Geo. L. Putnam, Mount Vernon, N. Y. Filed Feb. 6, 1883.

285,843. MAINTAINING PRESSURE IN SUPERHEATERS: David Renshaw, Braintree, Mass. Filed Feb. 24, 1883.

285,846. STEAM-JET CONDENSER: Louis Schutte and John Goehring, Philadelphia, Pa.; said Goehring assignor to said Schutte. Filed May 12, 1883.

285,849. SPARK-ARRESTER: Howard M. Smith, St. Louis, Mo. Filed April 7, 1883.

285,857. ELECTRIC MOTOR: Charles J. Van Depoele, Chicago, Ill. Filed Dec. 23, 1882.

285,858. ELECTRIC RAILWAY: Charles J. Van Depoele, Chicago, Ill. Filed Jan. 15, 1883.

285,865. VENTILATING APPARATUS: Levi J. Wing, Brooklyn, N.Y. Filed Jan. 5, 1883.

285,867. TICKET-PUNCH: Robert Woodman, Malden, Mass. Filed Aug. 15, 1883.

285,880. LANTERN: Frederick Dietz, New York, N. Y. Filed Oct. 10, 1882.

285,890. SLEEPING-CAR: Henry S. Hale, Philadelphia, Pa. Filed July 5, 1883.

285,892. STEAM-ENGINE GOVERNOR: Charles S. Haskell, Philadelphia, Pa. Filed Sept. 29, 1882.

285,899. SPARK-ARRESTER: George D. Hunter, Terre Haute, Ind. Filed Aug. 7, 1883.

285,900. SPARK-EXTINGUISHER: George D. Hunter, Terre Haute, Ind. Filed Aug. 7, 1883.

285,904. STEAM-ENGINE: Jacob Kaiser, Brookline, Mass. Filed July 10, 1883.

285,906. AUTOMATIC CAR-COUPLING: Michael Kennedy, Troy, N. Y. Filed March 5, 1883.

285,913. CAR-COUPLING: Isaac J. Merrick, Conotten, Ohio. Filed June 21, 1883.

285,920. TORPEDO-SIGNAL FOR RAILWAYS: Timothy G. Palmer, Schultzville, N. Y. Filed April 2, 1883.

285,944. AUTOMATIC ELECTRICAL RAILWAY-SIGNAL: Daniel H. Applegate, Red Bank, N. J. Filed May 10, 1883.

285,951. RAILROAD-GATE: Ira L. Ballard and John W. Craig, Mechum's River, Va. Filed March 14, 1883.

285,955. STEAM-VALVE: Thos. P. Barry, Stillwater, N. Y. Filed Mar. 13, 1883.

285,975. GUARD FOR CARS: John Craig, San Francisco, Cal. Filed Feb. 21, 1883.

285,984. CAR WHEEL AND AXLE: John Findlay, Montreal, Quebec, Canada. Filed Nov. 21, 1881.

285,986. RAILROAD-TIE: Clark Fisher, Trenton, N. J. Filed June 5, 1883.

285,994. DUST-GUARD FOR CAR-AXLE BOXES: Nathan M. George, Danbury, Conn. Filed June 11, 1883.

286,001. CAR-COUPLING: Lars G. Hedlund, Rothsay, Minn. Filed Aug. 2, 1883.

286,002. CUT-OFF VALVE: Thaddeus W. Heermans, Chicago, Ill. Filed March 5, 1883.

286,042. CAR-SPRING: Thos. J. Mayall, Reading, assignor to the Brunswick Antimony Company, Boston, Mass. Filed March 19, 1883,

286,054. CAR-COUPLING: Thomas R. Morgan, Guy Ruf, and David Davis, Jackson, Ohio. Filed June 28, 1883.

286,061. CAR-COUPLING: Robert T. Payne, Warm Springs, Va. Filed July 28, 1883.

286,062. VALVE-GEAR FOR STEAM-ENGINES: Richd. W. Peck, Brooklyn, N. Y. Filed March 27, 1882.

286,080. CAR-COUPLING: Charles Philander Searles, Columbus, Ohio, assignor of one-half to George W. Butler, same place. Filed Aug. 7, 1883.

286,098. CAR-AXLE LUBRICATOR: Jean F. Webb, Lebanon, Ill. Filed July 12, 1883.

286,102. ROTARY STEAM-ENGINE: Augustus B. Wood, Fountain Hill, Ark. Filed May 13, 1882.

286,122. RAILWAY-SIGNAL: Henry H. Eatherton, Monticello, Ill., assignor of one-half to Asa C. Thompson, same place. Filed May 12, 1883.

286,127. AUTOMATIC CAR-BRAKE: Samuel S. Fuller and Robert Salvadge, Stratford, Ontario, Canada. Filed March 21, 1882.

286,148. SAFETY-VALVE: Alexander Orme, Chicago, Ill. Filed July 7, 1883.

286,156. RAILROAD TIME-SIGNAL: Stephen J. Swayze and John C. Lane, Sag Harbor, N. Y. Filed April 7, 1883.

BEARING DATE OCTOBER 9, 1883.

286,175. CAR-COUPLING: Wendell Carter and Henry T. Woods, Boston, Mass. Filed April 6. 1883.

286,183. CAR-WHEEL: William B. Dixon, Springfield, Mass. Filed March 31, 1883.

286,197. FREIGHT-CAR: Arthur Grundy, New York, N. Y., assignor to himself, Henry A. Landgraff, and Edmund Tapscott, same place. Filed Nov. 2, 1882.

286,198. CAR-COUPLING: John E. L. Harbold, Worthington, Ky. Filed April 18, 1883.

286,207. CAR-COUPLING: Arthur Lenhart, Portland, Oreg. Filed Oct. 30, 1882.

286,249. MECHANISM FOR PLACING TORPEDOES ON RAILWAY TRACKS: Samuel F. Allen, Chicago, Ill., assignor of two-thirds to Thomas R. Freeman and James S. Toppan, same place. Filed June 14, 1883.

286,268. ELECTRIC SIGNAL FOR RAILWAY-TRAINS: Edward R. E. Cowell, Detroit, Mich., assignor to himself, Lewis Mann, E. C. Brown, and Robert Miller, same place. Filed Aug. 2, 1882.

286,271. CAR-COUPLING: George W. Cross, Gardiner, Me., assignor to Edwin Ingram, Philadelphia, Pa. Filed Aug. 6, 1883.

286,298. TRACK-DRILL: Eli S. Hart, Clinton, Iowa. Filed May 11, 1882. Renewed Aug. 29, 1883.

286,307. CAR-COUPLING: Henry L. Johnstone, Palmetto, Ga. Filed Aug. 23, 1883.

286,341. HEATING, VENTILATING, AND DRAFT-REGULATING APPARATUS FOR RAILROAD-CARS: James Spear, Philadelphia, Pa. Filed April 14, 1883.

286,352. TICKET-DISTRIBUTING BOX: Samuel B. Whitehead, San Francisco, Cal. Filed July 18, 1882.

286,353. CAR-BRAKE: Chas. D. Whiting, Chicago, Ill. Filed Aug. 9, 1883.

286,381. DEFLECTOR FOR RAILROAD PASSENGER-CARS: Alexander W. Brinkerhoff, Upper Sandusky, Ohio. Filed Dec. 29, 1882.

286,420. STEAM-WHISTLE: James E. Gause, Brownsville, Tenn. Filed April 10, 1883.

286,444. CAR-COUPLING: Edwin Ingram, Philadelphia, Pa., assignor to the National Automatic Car Coupler Company, of New Jersey. Filed July 6, 1883.

286,465. RAILROAD-SCALE: John L. Merrill, Pottstown, Pa. Filed Sept. 3, 1883.

286,470. SLIDING CAR-DOOR: Edward Y. Moore, Chicago, Ill. Filed Aug. 9, 1883.

286,473. LUBRICATOR FOR STEAM-CYLINDERS: Thos. A. Naylor, Baltimore, Md. Filed July 26, 1883.

286,480. CAR-COUPLING: Henry A. Palmer, Villisca, Iowa. Filed July 20, 1883.

286,482. STEAM-ENGINE: Joseph F. Pond, Cleveland, Ohio. Filed March 5, 1883.

286,492. CAR-COUPLING: George C. Short and William L. Roe, New London, Conn., assignors of one-fourth to Albert G. Davidson, same place. Filed Aug. 31, 1883.

286,493. CONDUCTOR'S FARE-RECORDER: James C. Shoup, St. Louis, Mo. Filed Feb. 26, 1883.
286,514. CAR-SEAL: John S. Wertz, Stanberry, Mo. Filed Dec. 19, 1882.
286,563. JOURNAL BEARING AND BOX: Robert W. Traylor, Richmond, Va. Filed Dec. 18, 1882.
286,564. TRACK-LAYING MACHINE: Ferdinand F. Voigt, Walla Walla, Wash. Filed April 17, 1883.
286,565. CAR-TRUCK: S. Stuart Williamson, Bridgeport, Conn., assignor to A. F. Carman, Brooklyn, N. Y., and S. D. Williamson, Washington, D. C. Filed July 27, 1883.

BEARING DATE OCTOBER 16, 1883.

286,573. BALANCED SLIDE-VALVE: James E. Baker, Madison, Wis. Filed Feb. 17, 1883.
286,575. LIVE-STOCK LOADER: William H. Barnes, Independence, Kans. Filed July 21, 1883.
286,578. CAR-COUPLING: Walter K. Berry, Swede Point, Iowa. Filed March 6, 1883.
286,579. LOCOMOTIVE ASH-PAN: Edward Bignell, Lincoln, Nebr. Filed June 4. 1883.
286,585. VALVE-GEAR FOR STEAM-ENGINES: Jacob Braunwalder, Milwaukee, Wis. Filed April 9, 1883.
286,622. CAR-COUPLING: Michael E. McDonald, Scranton, Pa. Filed Sept. 7, 1883.
286,623. RAILWAY-VELOCIPEDE: Ives W. McGaffey, Chicago, Ill., assignor to Everett B. Preston, same place. Filed March 7, 1883.
286,625. DRAFT-PIPE FOR STEAM-BOILER FURNACES: Frederick Mertsheimer, Denver, Col. Filed May 22, 1883.
286,634. SNOW-PLOW: John Phillips, Boone, Iowa. Filed April 7, 1883.
286,635. CAR-COUPLING: John F. E. Phillips, Hannibal, Mo. Filed Aug. 27, 1883.
286,651. RAILROAD-TIE: Enoch L. Taylor, Philadelphia, Pa. Filed Aug. 19, 1882.
286,655. MACHINE FOR STRAIGHTENING RAILROAD-RAILS: Francis H. Treat, Joliet, Ill. Filed Jan. 16, 1883.
286,682. RAILWAY-SWITCH: George Chalmers, San Juan, Cal. Filed Jan. 18, 1882.
286,702. MOTOR; Jas. B. Hunter, Ashley, Ill. Filed March 17, 1883.
286,713. RAILROAD-GATE: Michael H. Lantz, Marionville, Mo. Filed Dec. 6, 1882.
286,745. CAR-COUPLING: William S. Thayer, Owego, N. Y. Filed Sept. 6, 1883.
286,747. CUT-OFF VALVE: Chester B. Turner, Detroit, Mich. Filed Aug. 8, 1883.
286,762. OILER FOR CAR-WHEELS: Howard A. Barrows, Rochester, N. Y., and Robert F. Cummings, Landrus, Pa. Filed April 13, 1883.
286,773. CAR-BRAKE: Geo. M. Brill, Philadelphia, Pa. Filed Feb. 2, 1883.
286,776. CAR-TRUCK: Israel F. Brown, New London, Conn. Filed Dec. 15, 1881.
286,779. SNOW-PLOW: John A. Chisolm, Sauk Center, Minn. Filed Feb. 24, 1883.
286,841. ELECTRIC GOVERNOR: Edward B. Parkhurst, Woburn, assignor to himself and Albert L. Parcelle, Boston, Mass. Filed May 29, 1883.
286,844. ROTARY ENGINE: Nathaniel J. Pritchard, Boyce, Va., assignor of three-fourths to David E. Clark, Chambersburg, Pa., and Charles L. Pagenhart, Boyce, Va. Filed March 29, 1883
286,848. CAR-COUPLING: Joseph Rigby and Samuel S. McHugh, Ottawa, Kans. Filed Aug. 16, 1883.
286,856. ROTARY STEAM-ENGINE: James M. Smelser and Emmett L. Kennedy, Rushville, Ind. Filed Aug. 2, 1883.
286,877. CAR-ROOF: John Walter, Nashville, Tenn. Filed July 27, 1883.
286,895. SNOW-EXCAVATOR: Danthus P. Bier and Henry E. Rolph, Marshall, Minn., assignors of one-third to Henry M. Burchard, same place. Filed June 11, 1883.
286,915. RAILWAY-SIGNAL: Henry H. Eatherton, Monticello, Ill., assignor of one-half to Asa C. Thompson, same place. Filed May 21, 1883.
286,927. JOURNAL-BEARING: David A. Hopkins, Park Ridge, N. J. Filed Jan. 16, 1880.
286,932. MAIL-BAG CATCHER: Joseph Arther Kellogg, Nashville, Tenn. Filed Aug. 21, 1883.
286,985. COMBINED STEAM-ENGINE AND ELECTRIC GENERATOR: Leonidas G. Woolley, Dayton, Ohio, assignor, by mesne assignments, to the Ohio Power and Light Company, same place. Filed June 21, 1883.

BEARING DATE OCTOBER 23, 1883.

286,990. VISE: James O. Barrett, Erie, Pa. Filed Aug. 25, 1883.
286,992. CAR-COUPLING: Robert Bigney, Copleston, Ontario, Canada. Filed July 20, 1883.
286,995. VISE: Charles M. Boyce, Stoneham, Mass. Filed March 15, 1883.
286,999. CAR-COUPLING: Christopher Clarke, Northampton, Mass. Filed Feb. 16, 1883.
287,006. JOURNAL-BOX: George R. Cullingworth, New York, N. Y. Filed Feb. 21, 1883.
287,017. CAR-COUPLING: Ezra N. Gifford, Cincinnati, Ohio. Filed Feb. 1, 1883.
287,036. LIFE-GUARD AND TRACK-CLEARER: Richd. B. Locke, Brooklyn, N. Y., assignor of one-fourth to Charles W. Held, same place. Filed Aug. 21, 1882.
287,051. RAILROAD-SIGNAL: William H. Peddle, Roselle, and Samuel P. Thornton, Elizabeth, N. J. Filed Jan. 4, 1883.
287,069. STEAM-PUMP REGULATOR: Jacob Wagner, Pickering, Mo. Filed July 26, 1883.
287,070. CAR-COUPLING: Edward F. Walker, Providence, R. I. Filed May 9, 1883.
287,079. SIGNAL FOR LOCOMOTIVE HEAD-LIGHTS: Charles Anderson, Ludlow, Ky., assignor to Post & Co., Cincinnati, Ohio. Filed April 4, 1883.
287,084. CAR-COUPLING AND BUFFER: C. Canby Balderston, Westtown, and Charles Balderston, Philadelphia, Pa. Filed June 18, 1883.
287,085. LUBRICATOR: Cyrus W. Baldwin, Chicago, Ill. Filed Aug. 11, 1883.
287,110. CAR-COUPLING: John Burton Draper, Zanesville, Ill. Filed Aug. 21, 1883.
287,130. CAR-COUPLING: Thos. H. James, Republic, Mich. Filed May 19, 1883.
287,147. RAILROAD-GATE: David McNeely and James A. Drake, Princeton, Ind. Filed Jan. 5, 1883.
287,157. FOG-SIGNAL FOR RAILWAYS: Walter S. Phelps, Wortendyke, N. J. Filed Dec. 28, 1882.
287,202. CAR-AXLE: Augustus Walton, San Francisco, Cal. Filed M 14, 1883.
287,203. JOURNAL-BEARING: Edmund R. Ware, Worcester, Mass. Filed March 21, 1883.
287,268. CAR-STOVE: Kinsey Fife and James N. Pickenpaugh, Morgantown, W. Va. Filed May 19, 1883.
287,270. CAR-COUPLING: Charles J. Fortson, Washington, Ga. Filed July 18, 1883.
287,274. RAILROAD-FROG: Alonzo H. Gorton, Oswald C. Patchell, and William E. Gorton, Corning, N. Y. Filed Jan. 9, 1883.
287,289. DIRECT-ACTING COMPOUND ENGINE: Frank W. Jenkins, Brooklyn, N. Y. Filed Aug. 23, 1883.
287,291. WATCHMAN'S TIME-RECORDER: Albert M. Johnson, New Haven, Conn. Filed June 11, 1883.
287,293. CAR-BRAKE: Ernest Katzenmayer, Chillicothe, Ohio, assignor to the Mallinckrodt Brake Company, East St. Louis, Ill. Filed May 10, 1883.
287,296. RAILROAD-RAIL JOINT: Calvin M. Keefer, New Castle, Pa. Filed April 28, 1883.
287,374. CAR-TRUCK: Thomas J. Furbee, Bishop Creek, Cal. Filed July 28, 1883.
287,379. ROTARY STEAM-ENGINE: Lorenzo D. Hooper, Coffeyville, Kans. Filed March 10, 1881.
287,385. CAR-COUPLING: Conrad Luther, Scranton, Pa. Filed Sept. 4, 1883.
287,390. NUT-LOCK: Abram Reese, Pittsburgh, assignor of one-fourth to F. G. Kay, Allegheny City, Pa. Filed July 24, 1883.
287,395. CAR-BRAKE: William C. Travis, Gilman, Ill., assignor of one-half to William H. Francisco, Defiance, Ohio. Filed May 26, 1883.

BEARING DATE OCTOBER 30, 1883.

287,415. CAR-COUPLING: James Brown, Paine's Hollow, N. Y. Filed July 17, 1883.
287,418. DEVICE FOR CONNECTING PORTABLE RAILWAY-TRACKS: John J. Clarke, Patapo, Peru, assignor of one-half to A. W. Colwell, New York, N. Y. Filed Dec. 26, 1882.
287,446. ELECTRIC RAILWAY-SIGNAL: William W. Le Grande, Louisville, Ky., assignor to the National Electric Railway Signal Company, same place. Filed April 6, 1883.
287,455. CAR-COUPLING: James E. McMurtrey, Irvin Williams, and Frederick E. Okie, Burksville, Ky. Filed April 11, 1883.
287,466. ELECTRICAL CONNECTION FOR RAILWAY-SIGNALS: Thomas J. Pottinger, Louisville, Ky. Filed April 6, 1883.
287,483. CAR-COUPLING: E. H. Cady Tompkins, Glens Falls, N. Y. Filed Feb. 2, 1883.
287,486. TICKET-HOLDER: William B. Van Amringe, Providence, R. I. Filed March 12, 1883.
287,505. LOCOMOTIVE-BOILER: Charles B. Coventry, Chicago, Ill. Filed July 11, 1883.
287,528. CAR-REPLACER: Jesse T. Fosdick, Salamanca, N. Y., assignor to Charles W. Archer, Ludlow, Ky. Filed March 30, 1883.
287,572. CAR-AXLE BOX: Orestes Pagan, Philadelphia, Pa. Filed Nov. 13, 1882.

287,573. RAILWAY-RAIL BRACE: Michael R. Perkins, Portsmouth, N. H. Filed July 3, 1883.
287,583. RAILWAY-TRACK CLEARER: Geo. Royal, Davenport, Iowa. Filed April 27, 1883.
287,619. CAR-COUPLING: Wm. V. Brown and Thos. S. Poole, Arcadia, Nova Scotia, Canada. Filed April 10, 1883.
287,620. ATTACHMENT FOR STEAM-ENGINE GOVERNORS: William John Buchanan, Huntington, Ind. Filed Aug. 2, 1883.
287,629. CAR-WHEEL: David Connell, Wilmington, Del. Filed May 26, 1883.
287,638. CAR-SPRING: Nathan H. Davis, Philadelphia, Pa., assignor of one-third to Lewis C. Gratz, same place. Filed June 20, 1883.
287,650. DUMPING-CAR: William Fallon, Newburgh, N. Y. Filed June 12, 1883.
287,663. DUMPING-CAR: James T. Godwin, Norfolk, Va., assignor of one-half to Albert L. Woodworth, same place. Filed Sept. 6, 1883.
287,669. PISTON-PACKING: Le Vant O. Hall, Buchanan, Mich. Filed Aug. 10, 1883.
287,670. COMBUSTION DEVICE FOR STEAM-BOILER FURNACES: William Harman, Chicago, Ill. Filed Aug. 11, 1883.
287,674. GATE FOR RAILROAD-CROSSINGS: Eli J. Henkle, Baltimore, Md. Filed Jan. 4, 1883.
287,698. PLOW FOR UNLOADING CARS: Joseph McMullin, Casey, Iowa. Filed Aug. 24, 1883.
287,702. CAR-COUPLING: Robert T. Morrison, Jr., Medina, Ohio. Filed June 28, 1883.
287,732. RAILWAY-TRICYCLE: Henry K. Shanck, Dayton, Ohio, assignor of one-fourth to James A. Snell, same place. Filed March 31, 1883.
287,738. CAR-REPLACER: William Toombs, Logan, Utah. Filed June 23, 1883.
287,749. CAR-COUPLING: William H. White and Hiram F. Ruddell, Atlanta, Ga. Filed July 28, 1882.
287,759. CAR-COUPLING: Thomas Gates, Belfast, Tenn., assignor of one-half to H. C. Cannon and J. W. Adams, both of same place. Filed Aug. 24, 1883.
287,762. CAR-WHEEL-TRUEING MACHINE: James Henry Gowan, Chicago, Ill., assignor to William P. Black, same place. Filed Feb. 8, 1883.
287,771. CAR-COUPLING: Antone Muller, Mount Vernon, Ind., assignor of two-thirds to Henry Bastnagel and Henry Ritzert. Filed Sept. 1, 1883.

Fox's Improved Packing Chamber.

THIS invention, just out, consists of an inner part commonly defined *a gland*, and an outer sleeve. The former is provided with inclined planes or wedges concentrically arranged, which if pressed, will force together the packing into the box. An outer view of same, with box, is given in Fig. 1.

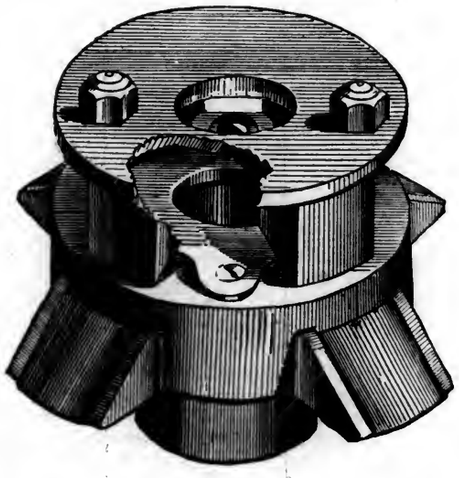


FIG. 1.

The casing or sleeve contains a series of square grooves, running radially from the center, and opening at both ends. Into these the packing fits, as do also the points of the wedges. A thin flat ring is fitted at the mouth of the box, fastened by screws, which confines the inner ends of the packing.

The Packing consists of parallel metallic blocks shown in Fig. 3. The method by which it is held in the box by the cap, is given in section on the left side of Fig. 2, and, on the right a *groove* is shown with the packing removed; the dotted lines *a*, *a*, point out the joints, which are absolutely tight, or proof against leakage. The letters *c*, *c*, Fig. 3, also describe the manner by which *the packing* of this box is effected; one of the segments being removed,

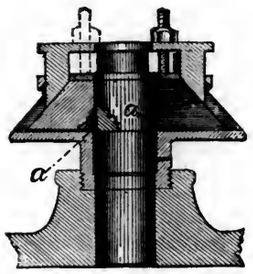


FIG. 2.

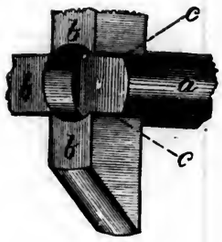


FIG. 3.

the narrow edges or surface lines are exposed. These will require to be as small as practicable in width, but sufficient to constitute flattened bearings for the series of blocks, which, it will be observed, do not pass by, but touch against each other; the surfaces needed not being enough, however, to prevent the tightening of the cap as the packing surface wears away.

An oil space (Fig. 2) is provided in the sleeve next to the packing; a necessary but uncommon provision.

In a chamber four inches diameter, there should be about four segments, and as the diameter increases, more. In operation, the entire pressure is brought upon the segments alone, and not upon the rod or shaft, thus producing *solely by contact*, a close joint, without the usual frictional loss of power or speed through pressure.

The segments are of anti-friction material, as Babbitt metal, of its various grades or qualities.

The device is well adapted to all valve stems, plungers, rolling shafts, and piston rods of all descriptions, where an adjustable packing is essential.

It is reasonably claimed that the use of this invention in hydraulic machinery will be attended with entire success, and to Railroad Engineers and Purchasing Agents it should here be said that for the modern locomotive, with its superior construction and adaptations, also for the modern stationary engine, of whatever type, nothing in the line of stuffing boxes can compare with this for simplicity or efficiency, none having provisions such as are now found in this Patent.

The inventor, Mr. Saml. Fox, of Toledo, O., will supply all necessary information further, as to cost of manufacture, if his circular is sent for and noticed.

Clingman's Nut Lock for Rail Joints.

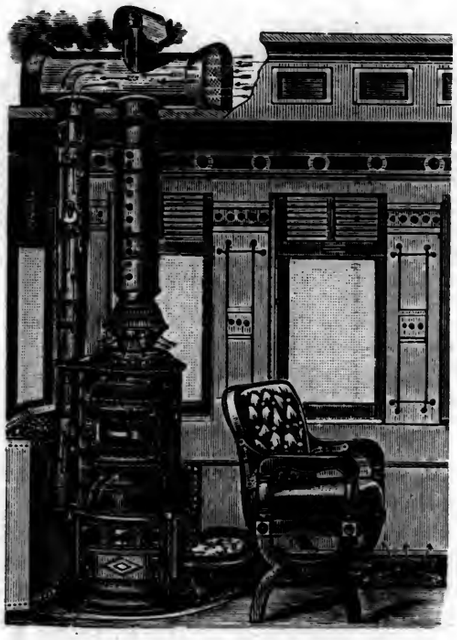
THIS patented invention, by J. L. Clingman, Cincinnati, is made of three pieces, either of which may be cut by machinery from any good quality of wrought iron of the requisite thickness. It is very simple and cheap to make, it is said to afford substantial and permanent security to the nuts, and to be, at the same time, capable of removal and reapplication, without damage to any of its parts. It is made in the following manner: A plate, with loops at

the middle, is applied to the bolts, and firmly secured by nuts against the side of the joint-plate. Next a locking-plate, having forked ends and notches, is applied to the said loop-plate. Said plates thus applied are then secured together by a split or bent key, passed through the loops and around both sides of the plate, thus firmly securing the locking-plate, which, by its forked ends fitting the sides of the nuts, is prevented from becoming loose. The lower prongs of the locking-plate are made longer than the upper ones, so that they may be tightly wedged between the angle of the nuts and the base of the joint-plate or rail, thus forming a brace between the nuts, securing thereby a lock which, the inventor claims, cannot be shaken or jarred loose.

Spear's Anti-Clinker Car Heater and Ventilator.

HEATERS for which the manufacturer claims that their use insures perfect ventilation, thorough heating, comfort and safety, call for special mention and detailed description. When the objects specified are accomplished, the difficult problem of heating cars as they ought to be heated, is solved. Practical readers, therefore, will follow with interest some particulars of the invention made by James Spear, Nos. 1014 and 1016, Market street, Philadelphia, which, we may add, has been tried, and is approved by very competent judges.

The principle of the invention is, that fresh air is taken in at the top of the car through the ventilator, passing down a pipe to the base of the stove around the heated cylinder and through a 4 x 6 pipe along the side of the car, escaping through registers between the seats, thus warming the feet of the passengers, thoroughly heating the car, and forcing the foul air through the opening at

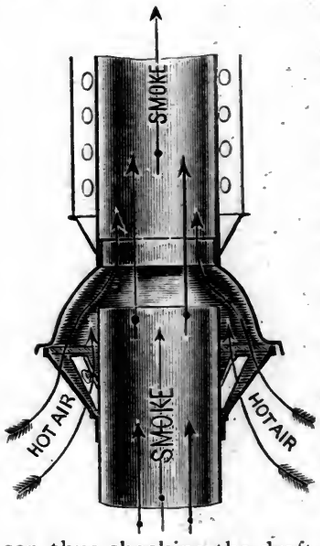


its top. A large volume of fresh air is admitted to the car through the ventilator on the roof, and distributed equally throughout the entire car, and persons sitting near the stove are as comfortable as those in any other portions of the car. In making the attachment from the heater to the tin pipe, a cast iron elbow is used, making a complete connection between the heater and hot air pipes.

The fire pot of the Spear heater is constructed in three sections, and is so arranged that any portion can easily be removed. From its peculiar shape and division, it should last a long time without burning out. It is easily repaired, and by replacing a few plates occasionally, lasts for years without renewing, There are safety latches applied to all the doors of the heater. These are readily opened when neceessary, and are positive locks to the door in case of accidents. Though cars containing this stove have been overturned in numerous cases, it has never been known to set fire to the car, or even to be moved out of its place. It is substantially constructed, thoroughly bolted together with strong iron rods, and firmly fastened to the car floor. The fire surface is large and so constructed as to insure a large amount of heat from the fuel consumed, which may be either hard or soft coal or coke.

The cuts illustrate Mr. Spear's Heat and Draft Regulator for Car Heaters, of the A and D pattern.

In cold weather, more heat is required than in mild weather, but as the draft of the stove is increased by the motion of the car, nearly as much heat is produced on a mild day as on a cold one. To prevent this, Mr. Spear has constructed a draft and heat regulator composed of two cast iron cones, joined together at their largest diameter. As shown in Fig. 1, the smoke pipe from the stove passes through the lower cone, and a sufficient distance into the upper one to leave an inch space between the pipe and the wall of the cone; the smoke pipe rests on the ledge of the upper one, all being firmly riveted together. The lower cone is supplied with a register. *When less heat* is required, the register is opened and a current of air rushes up through the opening into the smoke pipe, and is carried out through the roof of the car, thus checking the draft of the stove and causing less combustion of the fuel. When this regulator is open the fire will burn much slower, the fuel will last longer, and the stove require less attention. The passengers are relieved from the oppressive heat in mild weather, or any time during the winter when less heat is required. This mode of ventilation will be found to be preferable to that of opening the registers in the roof of the car, as in that case passengers are annoyed by cold air falling on their heads. The objects thus accomplished are: passengers are made more comfortable, a car can be heated when the temperature is at zero, the heat is controlled in mild weather, fire is retained in the stove a much longer time without attention, less fuel is consumed, and the heater itself will last longer. This improvement can be applied to all the Spear stoves now in use, at a trifling expense.



A kindred appliance is the Anti-Clinker Grate, the object of which is to remove the ashes and clinkers from the fire-pot without dropping the fire out. This can be done with less trouble than it takes to rake the old kind of stoves, and a continuous fire be kept going always fresh on the grate. By this means the entire surface of the

stove can always be relied on for heat; but in other stoves, when the grate surface becomes covered with clinkers and the cylinder half filled with ashes and clinkers, only the upper surface will afford heat, thus very often resulting in the overheating and ruining of the stove. With this improved grate, the base of the stove is always hot, and there is a bottom as well as a top view of the fire, whereas in all other stoves the fire can only be seen from the top. With Mr. Spear's improvement it can always be seen when the fire requires raking. By opening the small door in the base, communication is made with the lower portion of the fire, the person in charge can readily see when the fire needs raking, and all clinkers and ashes can easily be removed from the surface of the grate by the use of a simple poker.

We learn that the use of the Spear heater has never been attended with accident, such as the end of the car blowing out, water or steam escaping into it, or a passenger being injured in any way from its presence. Its safety under the extreme test of the overturning of a car is referred to at its proper place in this article.

Mr. Spear is the sole patentee and manufacturer of his inventions.

Improved Car-Coupling.

THE objects of the following described improved car-coupling, invented and patented by A. Lenhart, of Portland, Or., Oct. 9th, 1883, are: First. To secure a perfect and complete coupling, safe and durable, that can be used on all rolling stock, either freight or passengers cars, and which will couple itself without human agency when brought together; and, second, can be uncoupled from the top or either side of the train. These objects are attained by the following mechanism: the drawhead, which we will call *a*, and bar are in two parts, attached together by means of a pin, so as to allow the drawhead to swing slightly to one side in coupling.

The drawhead has a flat face about five or six inches in depth and seven or eight inches in width, which serves as a buffer, thus doing away with the separate buffer used with the "Miller Coupler," is simple and costs a great deal less. One side of this drawhead is hooked, which, for the purpose of explaining, we will call the right side, and the left side has a tongue which enters the hook on the right side of drawhead *b*, as they meet, at the same time that the tongue or drawhead *b* enters the hook or drawhead *a*. A semicircular recess runs vertically through the center of the drawhead, into which fits a semicircular pin, held to its place, with its face at an oblique angle to the face of the drawhead, by a spring, and so as to turn till its face becomes parallel and flush with that of the drawhead. When the drawheads come together the recesses meet in the center and form a round hole, and the parts fitting in them, by coming together, form one round pin exactly fitting the aperture. This pin is the means which fastens the coupling, and by which it is uncoupled. In coupling, these two parts are pressed back by the drawheads as they come together, till their faces become parallel with those of the drawheads, and until they have met in their proper places, when they spring back to their original oblique angle, thus fastening the coupling so that it will never part, no matter from which direction the strain may come. The coupling is uncoupled by turning this pin till the faces of its parts become parallel and flush with the faces of the drawheads, when the connection will be entirely free. Each of the parts of this pin has a small crank on the lower end under the drawhead, and is connected by a rod to a bell-crank attached to the drawbar under the car, and from thence, by rods, to cranks on each side of the car, one of which cranks has a rod running to the top of all freight cars (passenger coaches need only one rod running to the platform). By turning one of these cranks from either side of the top of the train the coupling is uncoupled, and it may be uncoupled from either car, as the turning of one half turns the other. It may also be uncoupled though one side be broken or disconnected, or be only attached to a link-and-pin drawbar, as it may be. This coupling has advantages. It is durable and safe. It is far more practical and convenient than any now in use. It excels the best coupling, in not requiring a separate buffer, in being applied to all cars, in having the means of coupling and uncoupling concentrated in a single pin in the center, and by not requiring to be operated from both cars. One half of a train may be connected with link-and-pin, and the other half with this coupling. The engineer always has absolute control of his engine, as he can attach and detach it from his train, at will, while remaining in his cab. And lastly no slack is required to be given in order to uncouple.

Putnam's Railway Metallic Cross Tie and Trough.

MR. GEORGE L. PUTNAM, No. 952 Broadway, New York, has been granted a patent covering any kind of metallic tie with a depression in its upper surface, for the purpose of holding a trough. Its probable value appears from certain facts familiar to every railroad man.

It is customary on trunk line railways to supply the locomotives of through trains with water, while they are in motion. For this purpose a trough, a fourth to half a mile in length, is sunk into the ties between the rails. To place the trough in position, it is necessary to cut the ties so much that they offer but little protection against the spreading of the track. Moreover, every time that a locomotive is supplied with water, a quantity of it is swashed out of the trough on to the track, thus keeping the wooden ties water-soaked all the time, causing them to decay rapidly, and making it necessary to replace them very often. This is an expensive and difficult process, with the trough in position. Mr. Putnam's invention is designed to obviate the present necessity of renewing ties frequently,

HENRY W. GWINNER, who died by his own hand in this city, on the 19th ult., was a veteran business man, experienced in railway matters. From 1858 to 1880 he was in the service of the Pennsylvania Company. Mr. Gwinner was a capable, genial and popular man. His death, which was the terrible expression of temporary aberration of mind, is deeply deplored. He was born in Philadelphia about sixty years ago. A melancholy interest attends our business relations with him. About an hour before his death he signed a check in payment to the publishers for advertising, the last business act of his life.

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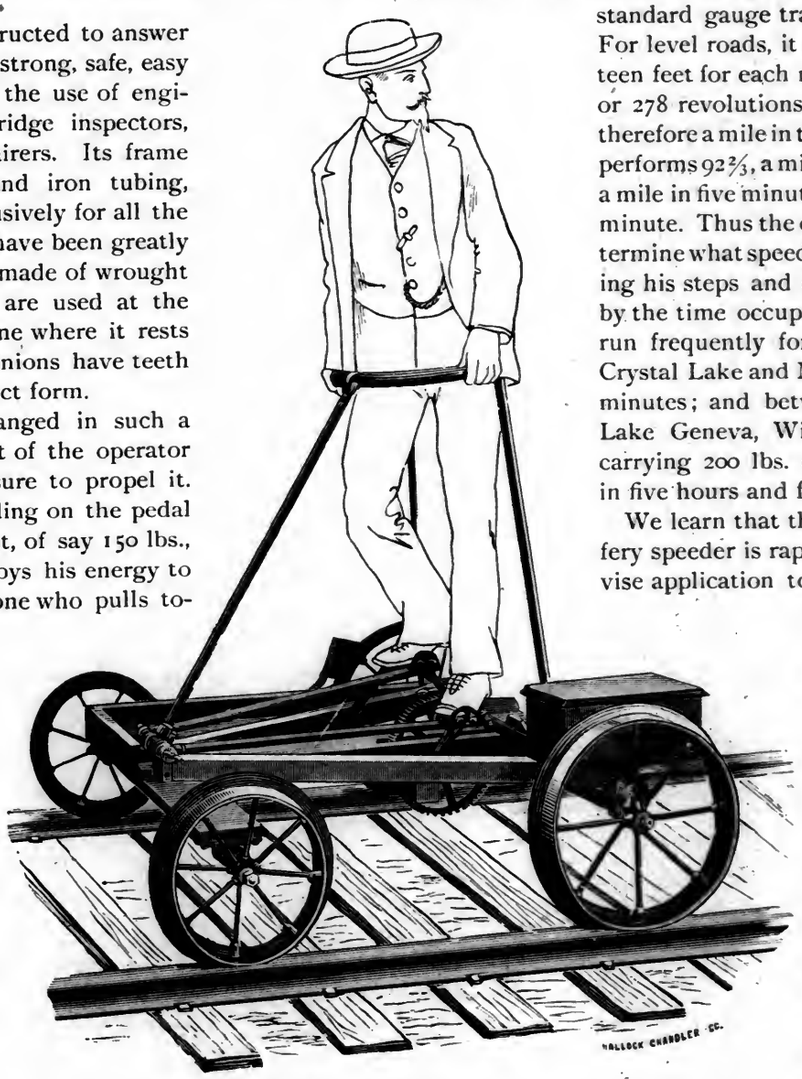
The T. B. Jeffery Railroad Velocipede or Speeder.

THIS contrivance was awarded the first premium, silver medal, at the National Exposition of Railway Appliances, held in Chicago, May 24 to June 23, 1883. It is manufactured by T. B. Jeffery, Nos. 38 and 40 South Canal street, Chicago.

The speeder is constructed to answer the demand for a light, strong, safe, easy running velocipede, for the use of engineers, road masters, bridge inspectors, and telegraph line repairers. Its frame is of selected maple and iron tubing, and steel is used exclusively for all the journals. The wheels have been greatly improved, and are now made of wrought iron. Friction rollers are used at the four corners of the frame where it rests on the axles, and the pinions have teeth cut by machine to perfect form.

The machine is arranged in such a manner that the weight of the operator is used in a great measure to propel it. Manifestly, a man standing on the pedal and allowing his weight, of say 150 lbs., to fall ten inches, employs his energy to better advantage than one who pulls toward him 150 lbs. for the same distance. It should be remembered, moreover, that in the employment of the crank, power can be advantageously used only during a small portion of its revolution, that is when it is at right angles to the direction in which the force is applied. When the crank is at or near the dead centers, much of the power is expended on the axle, and only a small amount of force transmitted to the driving wheels. If then the work is done by standing on a lever and allowing the weight of the body to fall to operate it, no power is expended if the lever fails to descend, and little if the weight falls slowly as it does at first, and toward the end of the stroke. This is not the case if the power is applied by straining the muscles, pulling on a crank either directly or through an intermediate lever. The strength can rapidly be exhausted by pulling, even if the machine fails to move at all. In the Jeffery speeder the position of the operator is such that he can look out well forward or backward for approaching trains, can see clearly the whole of the road, can change his position on the platform and manner of working so as to afford a partial rest while running, and can leave instantly on an emergency without being entangled with any of the gearing or appliances. The arrangement is such, that no danger will occur if the brake is suddenly applied, or if the operator fails to lean the right way when turning a curve; and the gearing is so arranged that the operator can run the machine backward or forward without danger of derailment. A quantity of supplies, and one or two persons beside the operator, can be carried conveniently on the platform, and assist in propelling if they desire. The speeder is kept in stock for standard gauge tracks, 4 feet 8½ inches. For level roads, it is made to travel nineteen feet for each revolution of the crank, or 278 revolutions per mile. In running therefore a mile in three minutes, the crank performs 92⅔, a mile in four minutes, 69½, a mile in five minutes, 55⅗ revolutions per minute. Thus the operator can readily determine what speed he is running by counting his steps and comparing the number by the time occupied. The car has been run frequently for eight miles, between Crystal Lake and McHenry, Ill., in twenty minutes; and between Chicago, Ill., and Lake Geneva, Wis., seventy-two miles, carrying 200 lbs. of Sunday newspapers, in five hours and forty-five minutes.

We learn that the demand for the Jeffery speeder is rapidly increasing, and advise application to the manufacturer for further information.



THE T. B. JEFFERY VELOCIPEDE OR SPEEDER.

Kling's Car-Coupling.

THE car-coupling invented and patented by Isaac Kling, Louisville, Kentucky, is commended by its simplicity, durability, and trifling cost. Moreover, while it works automatically, no change need be made in the draw-bar, and cars of unequal height can be coupled by its means.

Mr. Kling's invention consists, mainly, in an automatic coupling, having a shouldered coupling-pin, which is applied to a T-head spring actuated guide; also, in a coupling-link which is provided with a block of metal, rubber, or wood end filling and perforated clamping plates.

Details can be procured from the inventor.

THE commendations of railroad men and experts as to the efficiency of the McLeod Automatic Air Signal are emphasized by the testimony of the Massachusetts Railroad Commissioners, who say of it in an official report, that it is "an ingenious and inexpensive device, by which the coming of a train is announced far in advance, both by visible and audible signs." We direct attention to the advertisement of the manufacturers, which appears in this issue of the JOURNAL.

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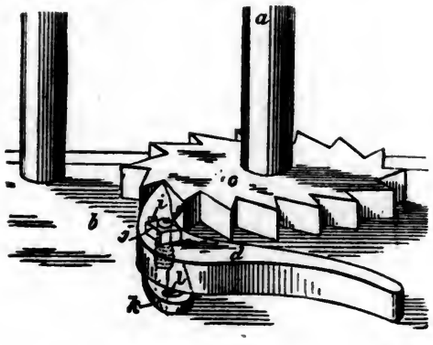
The Readio Improved Car Seat.

THE inventor of this recent improvement in car seats is Arthur Readio, Pawtucket, Rhode Island.

His car seat is a reversible summer and winter seat, and its use prevents the necessity of storing the summer seat while the winter one is in use, and *vice versa*. The winter seat consists of an upholstered back and seat. Its back is so shaped as to fit the human form, being slightly convexed in the center. Unlocking the sides of this seat causes it to reverse on a pivot, and provides a cool summer one, which is made of perforated veneer, leather, rattan, cane, split bamboo, or any other suitable substance. By locking again, the seat is secured and made of the same shape as the upholstered seat, which is then at the back, facing the person sitting behind. Between the one back and the other is a space of about two inches, which serves as an air space, so that at all times there is a current of fresh air at the back of passengers. Readio's seat is perforated at the top and bottom, which promotes ventilation, and also prevents dust from accumulating in the air space, for when the back at the end of a route is turned over, the dust falls to the floor through the perforated bottom. The seat is similar in construction to the back, only that it is lifted out when the upholstered side is up. Turn it over, replace it, and a cool seat of the same material is presented. This is perforated at the sides for ventilation, and an air space similar to that of the back is provided between the two seats. The Readio seat is concave in form, thus preventing the passenger from slipping out at any irregularity in the motion of the cars. When the upholstered parts are worn, by a simple device which holds the parts together, they can be easily removed, while the other parts remain in use. After repairs the upholstered parts can be replaced with little or no trouble.

The Pitard Patent Brake Dog.

THIS patented invention of J. H. Pitard, Mobile, Alabama, consists of a spring, in combination with the pivot of a car brake staff dog, to cause the dog to automatically engage the ratchet-wheel of the staff for locking it when set to hold the brakes on, the spring being contrived in the eye of the dog, through which its pivot-bolt passes, so as to be protected from injury, and also to be concealed from view. The arrangement provides a means for causing the dog to engage quickly, and at any time that the staff may be turned to apply the brakes.



The figure is a perspective view of part of a car platform and brake-staff, with this improved spring-dog contrivance.

The staff *a* of the brake is arranged on the platform *b*, and provided with a ratchet-wheel *c*, in the usual manner, with which a dog *d*, is also employed, as in the common way, except that a spring *e*, is coiled around the pivot-bolt *f*, in the part which extends through the pivot-eye of the dog, one end of which spring is connected to the bolt by dropping down a slot *g*, in said bolt, and the other end *h*, is similarly connected with the dog by dropping down the slot *i* in the dog, and the spring is arranged to have tension when the dog is turned into the position for dropping down to its place on the platform by the side of the ratchet-wheel, to thrust the dog into the teeth. A nut *j* is screwed down to the shoulder of the screw-threads on the pivot-bolt above the dog to bind fast on the bolt without binding the dog, but so as to keep the dog in its place, and the bolt, which has a washer *k*, for a pivot-support of the dog, extends down through the platform, and is secured by a nut, key, or other means, as may be preferred, and the washer *k* may be fixed to the platform *g* by a screw *l*.

Advantages claimed over the old style of dog are: 1. That it, being automatic in action, is quicker in application, and therefore more conducive to public safety than the old style. 2. That on passenger trains it can be instantly applied (the foot not being needed) in case the air brakes should suddenly fail. 3. It is particularly advantageous on dark nights when the brakeman may not have his lantern, or is prevented from other causes from quickly adjusting the dog to apply the brakes. 4. It obviates the danger of brakes being thrown off by a sudden jar, when the ratchet-wheel is about worn out, as in such case the spring causes the dog to catch in the next tooth following. 5. The spring is concealed from view, and is therefore protected from injury. The patent brake is adapted to all railroad and street cars.

Shaler's Rotary Engine.

THIS engine principally consists of two cylinders bolted to a suitable bed-plate, and through the centers of these two cylinders extends the main shaft, or axle. There are two fans or pistons fastened to opposite sides of this shaft, and such a distance apart that each revolves in its own cylinder. Other points of construction are two slides operated by cam movement, and levers which slip out and in directly behind the fans above-mentioned, through a slot in the circumferences, and through the radii of each cylinder, so that a steam-tight partition is formed in each cylinder alternately behind the fans. It will be seen from this construction that the steam pressure will be required to carry each fan half-way round in order to make one revolution, and the rest of the revolution, with time deducted for the raising of the slide, can be used for the expansive power of the steam, which is calculated to be expended before the slide starts to rise, so that the power required to raise the slides is very small. The engine is supplied with a perfect balance cut-off valve, which changes the steam first to one cylinder and then the other. There are two steam chests situated on the sides of each cylinder, for the purpose of reversing the engine. Within these chests are two common slide valves, which simply change the supply and exhaust ports from one side of the slides to the other when the engine is required to be reversed. By this construction it will be understood that the exhaust ports are always open

to the air, and that the engine can be reversed under a full head of steam. The interior surfaces of the cylinders are turned slightly tapering toward their outer circumferences, and the fans revolving inside are supplied with tapering packing plates, of brass or any suitable metal, and secured with set screws, which can be reached through slide openings from outside of the cylinder, so that the fans can be properly packed without removing the cylinder heads. Every portion of the engine can be perfectly and easily packed.

The engine described, as compared with the reciprocating engine, is designed to run with a great saving of steam and fuel. Its inventor believes it to be especially adapted to any purpose requiring a compact and powerful engine, and that it may fill the place of any reciprocating engine, with economy. It might be also applied to road vehicles and street cars, by attaching the drive-wheels directly to the main shaft. A vehicle thus provided, its inventor claims, could run equally well in either direction, stop and start at any point, run fast or slow, and be of comparatively light weight.

Clarence A. Shaler, Fox Lake, Wis., is the inventor and patentee of the Shaler Rotary Engine.

A New Hand Car.

THE hand car manufactured by the Kalamazoo R. R. Velocipede Company, Kalamazoo, Michigan, is recommended as being very speedy and durable. Some peculiarities in its construction merit particular mention. The cranks are set obliquely to each other, doing away with dead centers and economizing the power used. The trussed levers pass each other to their pivots, and so are made to apply the power to both sides of the spur gear, thereby securing additional leverage. The gas-pipe frame or standard, is light, strong and durable, and occupies but little space. An S shaped brake works on both wheels at the same time. It is very strong, and is instantaneously operated by simply stepping on the pedal. The Kalamazoo R. R. Velocipede Co's new hand cars are made in two sizes: the section car, weighing 450 pounds, and amply strong for ordinary section work, and the telegraph car, weighing about 300 pounds, which is easily handled by two men.

The Burton Stock Car Co.

THE Burton Stock Car Co., of Boston, Mass., have just completed ten cars, making twenty-three which they now have running. These cars give great satisfaction to both shippers and receivers of live stock, and are worthy of commendation on account of the prevention of suffering to the cattle as well as saving of weight and improvement in quality and healthfulness of the beef. The Burton Stock Car Co. have made arrangements with two leading Trunk lines to run their Improved Stock Cars. These cars are in great demand by stock shippers, and all the cars they have are now engaged by shippers for five weeks in advance. Shippers have written that they would pay $5 per head for the use of this car for long distances in shipping stock, rather than ship in the ordinary stock car.

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MEXICAN NOTES.

IT has been shown by statistics of railway travel in the United States, which, in spite of all that has been said to the contrary, is one of the safest of countries in this respect, that the proportion of accidents to travelers is much less than to persons about their ordinary affairs, so that it is really safer to travel than to stay at home!—*The Mexican Financier.*

THE Mexican Central line between the city of Mexico and the United States will be completed by March 1, 1884. It will be opened to traffic for some time before the official celebration of its completion, which will probably take place on May 5, the Mexican national holiday.

OUR well-informed contemporary, *The Mexican Financier*, says that the report of the general inspection of the railways of the Federal District gives an account of the work done during the fiscal year of 1882-3. The District-Railways Company, on its Tlalpam line, constructed a direct line from San Lucas to San Antonio, a distance of 12,665 meters, and a branch between Churubusco and Coyoacan, 3,227 meters. On the Santa María line the circuit of Ciprés was constructed, 1,052 meters, with a double track of fifty-seven meters. On the Peralvillo line, from the corner of Tepozan to Peralvillo, 1,052 meters of track were constructed. On the Dolores line a double track of 1,440 meters was built. On the La Piedad line double track of 651 meters was built. On the Mixcoac line a branch was built to the hacienda of Castañeda, 398 meters. On the Guadalupe line a double track of 660 meters was built, and in Guadalupe 248 meters of track were added. On the Atzcapotzalco line a double track between Tlaxpana and the Calzada of Patolco, 1,319 meters, was built. Altogether, the company built 22,247 meters of new broad-gauge track, and has now in operation 125,379 meters of track. The line between Atzcapotzalco and Tlalnepantla is now under construction. The company received during the year twenty-three new first-class coaches, twelve second-class and ten platform cars. The company owns on its broad-gauge system 106 first-class coaches, sixty-one second-class, forty-two platform cars, three box cars, and twenty funeral cars. The company owns 1,400 mules and 500 horses. No new track has been added to the narrow-gauge system of the company, which has an extent of 20,202 meters. Eight new first-class narrow-gauge cars were received, making a total number of thirty owned by the company, and seventeen platform cars. The number of passengers carried by the company in the course of the year was 9,134,868. On the Baths-Circuit Railway, 600 meters of narrow-gauge track were constructed, to complete the circuit between the Alberca Pane baths and the Ciudadela. The total length of the circuit is 6,000 meters. The company owns twenty-three passenger cars, thirteen platform cars, two box cars, and eighty mules. The work on the Central Table-land Railway (broad-gauge) began at the gate of San Antonio Abad on April 17, last, and up to date of the report, a length of 3,000 meters of embankment, and 1,400 meters of cutting had been constructed.

A street railway is to be built in Monterey, Mexico, by R. H. Tilotson.

THE New York and New England Railroad has recently adopted for its passenger locomotives a heavy, deep-toned whistle, which is easily distinguished from the shrill whistle of the freight engines, and which is designed to be another factor of safety for travel, as all trains and track hands know that this whistle denotes a passenger train, and are thus warned to have switches closed and tracks clear for its passage.

THE Brotherhood of Locomotive Engineers has nearly thirteen thousand members. Its financial strength is evidenced in the fact that during the year of its existence recently ended, it paid out $118,233.72, in claims to representatives of deceased members.

THE McLeod Air Railroad Signal in use on the Old Colony Railroad "is working perfectly and with entire satisfaction," as stated in a report seen by our representative.

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Many attempts have been made to imitate the outside appearance of our Barber Improved Braces, but no one dares to use our Patent Jaws, as seen in this cut, and no brace is good without them. We guarantee these tools to be perfect in every respect, and that they will give great satisfaction to all who use them. Hardware dealers will furnish them on demand at our prices, or we will forward one by express on receipt of Three Dollars.
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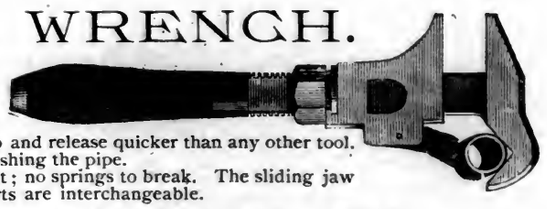


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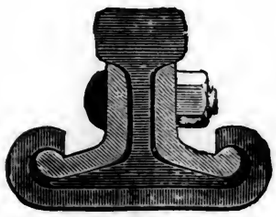
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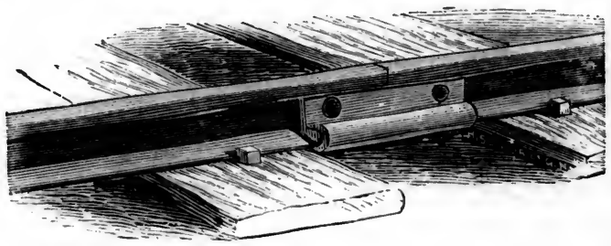
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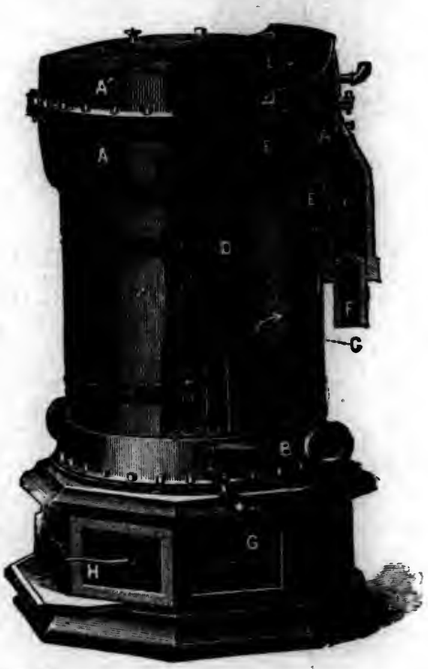
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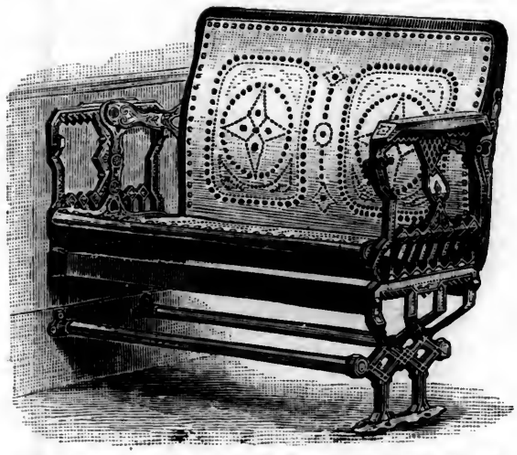
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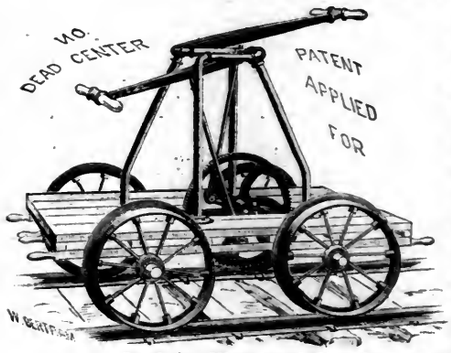
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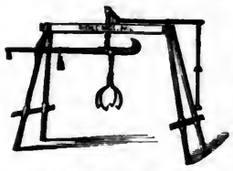
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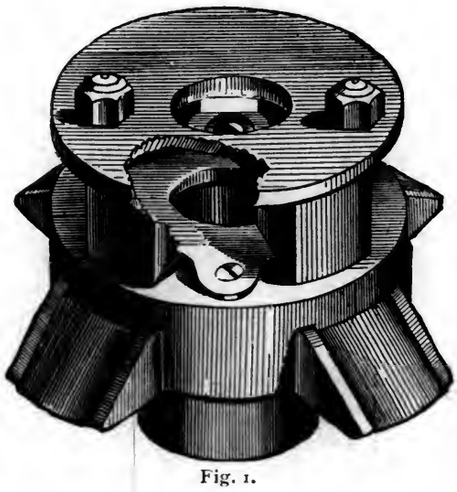


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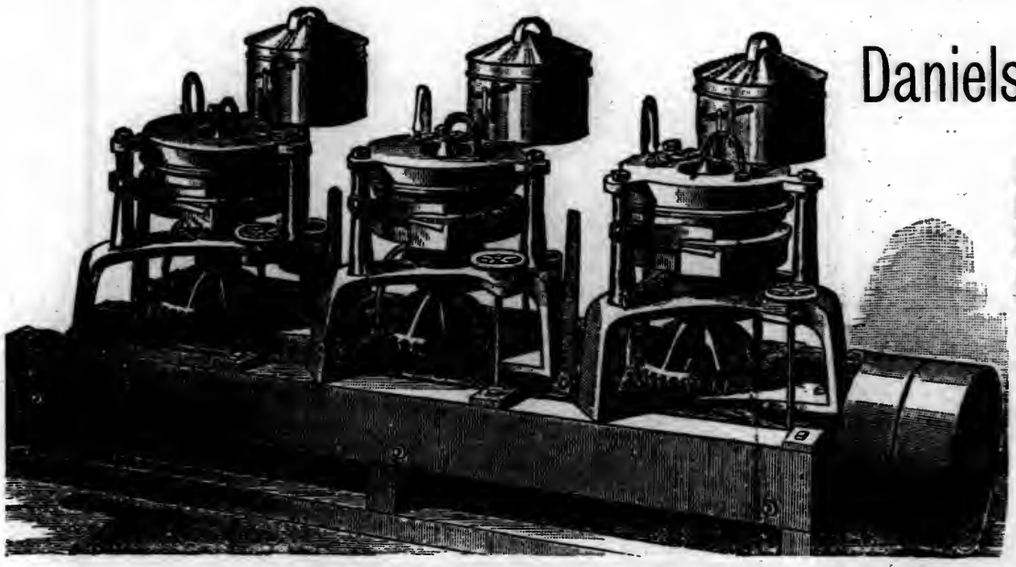
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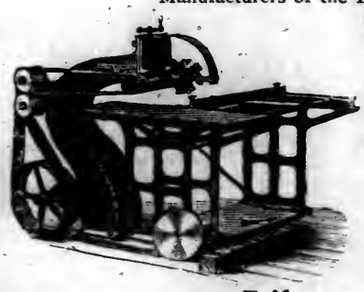
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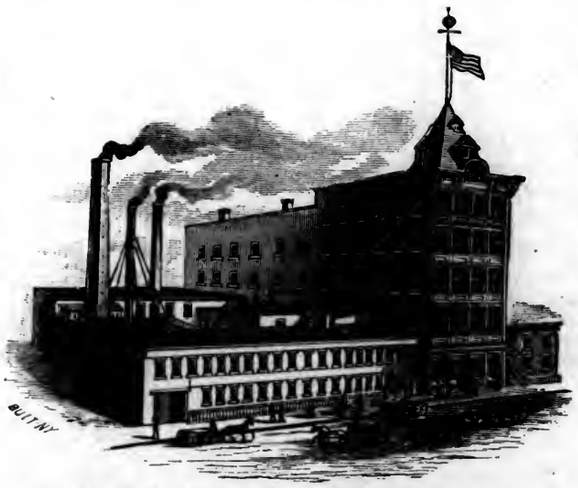
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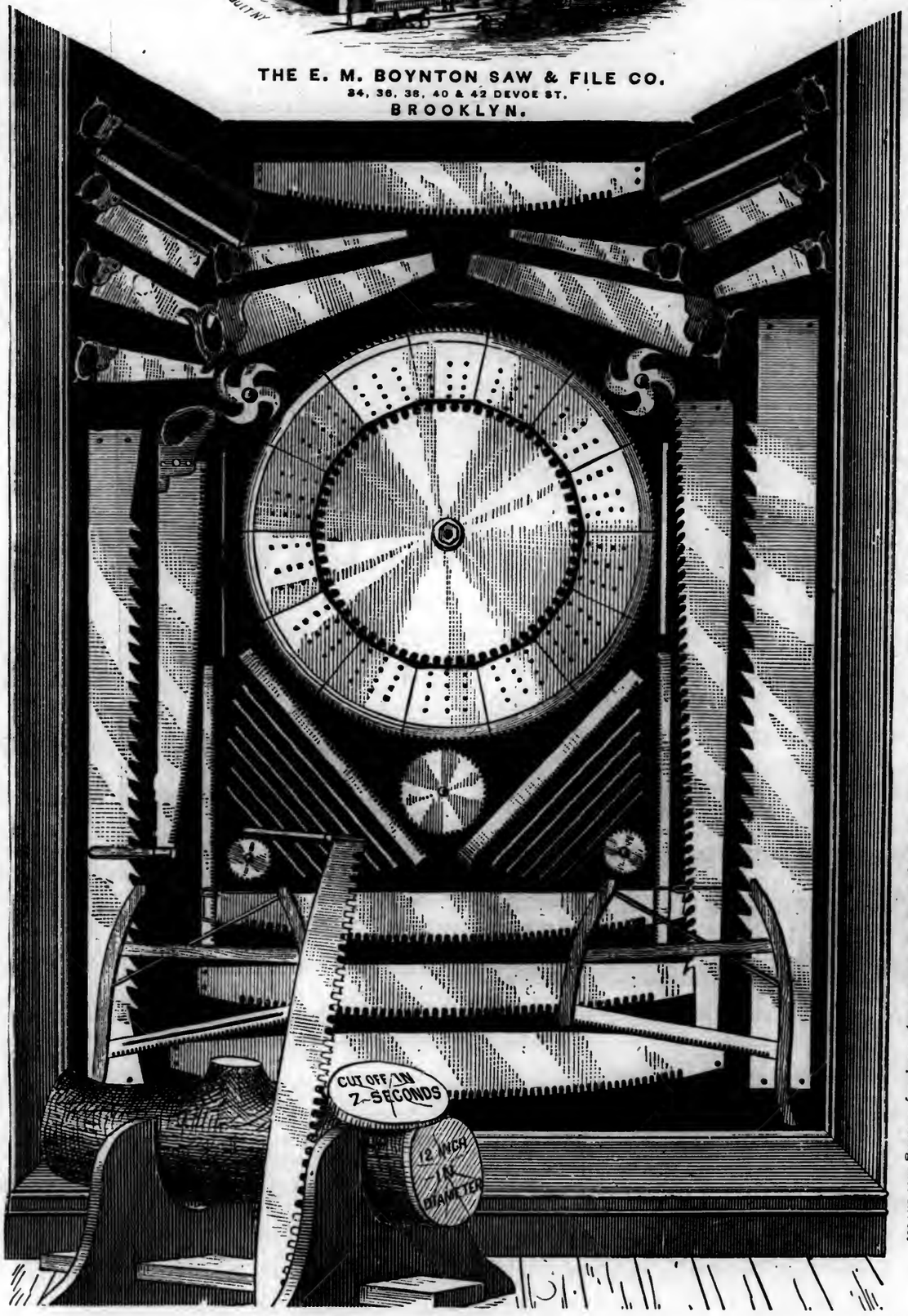
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AMERICAN
Railroad Journal
·ESTABLISHED·1831·

WHOLE NO. 2,547.] NEW YORK, DECEMBER, 1883. [VOLUME LVII.—No. 9.

Railroad Notes.

WE invite railroad officers to send us notice of elections, transfers, appointments, resignations, etc.; and all our readers would oblige us by furnishing us with any items of news which may come to their knowledge and are of a suitable nature for our columns. It is our intention to publish monthly full and accurate information regarding those enterprises and industries to which the AMERICAN RAILROAD JOURNAL is devoted, and to effect this end we solicit the coöperation of readers interested therein. We aim specially to record all new railway enterprises in the United States and Canada, and to note the progress of construction on all new roads and extensions; and we request those concerned in railway building to give us early information concerning the above, that our reports may be as complete as possible.

THE Atchison, Topeka and Santa Fé Railroad Company has contracted to equip its freight trains with the Westinghouse automatic brake.

THE general passenger agent (Mr. Henry Monett) of the New York, West Shore & Buffalo, New York, Ontario & Western, Syracuse, Ontario & New York, and Wallkil Valley Railroad companies, has issued a circular announcing that on and after the third instant, the parlor car service between Jersey City and Washington, on trains 56 and 57 is discontinued. Parlor cars on these trains are run between New York and Albany.

MR. JOHN MCDONALD, has been appointed emigrant agent of the New York, West Shore & Buffalo Railway Company, with temporary headquarters at No. 24 State street, New York.

AN organization has been completed with the view to build a narrow-gauge railway between Denver and Memphis, and open an outlet east for the narrow-gauge system of the Rocky Mountains. The company was organized under the laws of Kansas, and is known as the Denver, Memphis and Atlantic Narrow-Gauge Railway Company. Its directory is as follows: Hon. M. Mercer, of Bailey, Coleman & Co., bankers and brokers, New York. Col. John Doniphan, president St. Joe, Kansas City and Arkansas Narrow-Gauge Railway, St. Joseph, Mo.; Major Jo. Hansen, vice-president St. Joe, Kansas City and Arkansas Narrow-Gauge Railway, St. Joseph, Mo.; ex-Gov. Wm. Gilpin, Denver, Col.; N. M. Jones, president First Nat. Bank, Memphis, Tenn.; H. M. Hansen, general agent Union Pacific ticket and passenger department, St. Joseph, Mo.; Patrick Murphy, president Miner's Bank, Joplin, Mo.; M. L. Read, banker, Winfield, Kans.; J. M. Endicott, M. D., Sedan, Kans.; Hon. J. C. Strang, Judge District Court, Larned, Kans.; W. C. Edwards, Register of Deeds, Larned, Kans.; H. P. Myton, Reg., U. S. Land Office, Garden City, Kans.; Col. S. S. Prouty, Pub., Sidney, Kans.; Thos. Donohue, banker, Belle Plaine, Kans., and J. J. Burns, P. M. and Pub., Belle Plaine, Kans.

THE Cleveland, Akron and Columbus Railroad claims to be the first in the world to adopt the twenty-four hours system of time. Day begins at midnight as now, and is continued up to twenty-four o'clock. Another innovation on the same road is the introduction of a system of weather signals now in use on the regular trains. These are said to be very valuable to farmers and others along the line of the road, and other railroad companies are considering the advisability of using them.

MR. BRADFORD DUNHAM has been appointed general manager on the Louisville and Nashville Railroad. He directs the operations of the transportation, mechanical and road departments office, at Louisville, Kentucky.

THE American Institute Fair, recently closed, was the best of late years; probably the best of any exhibition hitherto made by the Institute. It was largely attended. The machinery department was one of its best features.

THE official statement of the business of the Philadelphia and Reading Railroad and Coal and Iron Companies for October has been issued. The gross receipts of the railroad company were $3,531,436.21, and expenses, excluding interests and rentals, $1,630,477.68, leaving net earnings of $1,900,958.53, being an increase, as compared with the corresponding month of last year, of $77,407.08. This statement includes the following returns from the Central Railroad of New Jersey; gross receipts, $1,150,248.20; working expenses, $544,783.11; earnings, $605,465.09; rental for October, 1883, $534,322.07; profit for month, $71,143.02. The net receipts of the Philadelphia and Reading Coal and Iron Company for the month were $150,302.39, being a gain, as compared with the corresponding month last year, of $22,352.96.

THE report of the Secretary of the Interior (Mr. Henry M. Teller) for the fiscal year ending June 30, 1883, is an interesting document. Secretary Teller repeats what he said in his last previous report as to the necessity for some legislation in reference to lapsed railroad land grants; and recommends the "prompt and serious attention" of Congress to the subjects of the taxation of railroad lands and the titles to the same.

THE stockholders of the East Tennessee, Virginia, and Georgia Railroad Company met in annual session on the fourteenth ult., at Knoxville, Tenn. The annual reports show the revenue for the year from all sources to be $3,776,754, and the operating expenses $2,383,702, leaving a net revenue of $1,393,052. The number of miles of road operated is 1,086. There were represented at the meeting 227,209 shares of stock. The company has bought 100 acres of ground in the suburbs of Knoxville, on which railroad shops for the entire system of the East Tennessee, Virginia and Georgia Railroad will be erected. The shops now in the center of the city will be removed to the new location.

COL. C. O. SANDFORD, one of the oldest civil engineers in the South, died in Petersburg, Va., on the 29th ult., aged 73. He was born in New York State in 1811, but had lived in Virginia for many years. Under his direction that portion of the Norfolk and Western Railroad running from Petersburg to Lynchburg was built. He also supervised the building of the Augusta (Ga.) Canal and the railroad running from Chatham, Va., now composing part of the Raleigh and Augusta Air Line. In 1856 Col. Sandford was elected Superintendent of the Petersburg and Weldon Railroad, and in 1863 was elected President of the company. He subsequently resigned the office. His remains will be taken to Savannah, Ga., for burial.

THE new Board of Directors of the New York, Lake Erie and Western Railroad, have reëlected the old board of executive officers. An annual dividend of 6 per cent. on preferred stock was declared, payable Jan. 15. The books will close Dec. 20 and reopen Jan. 16.

THE statement of the business of all lines of the Pennsylvania Railroad Company east of Pittsburgh and Erie for October, 1883, as compared with the same month in 1882, shows an increase in gross earnings of $215,294, an increase in expenses of $30,856, an increase in net earnings of $178,438.

THE gap in the diagonal road between Des Moines and Marshalltown, Iowa, has been closed, and a junction effected with the Wabash track, which will be used until the track is laid into Des Moines. The new road is ninety-six miles long, and only lacks four miles of a connection with the Illinois Central, at Cedar Falls, which will be closed at once.

THE proposed extension from the McMinville and Sparta Branch of the Nashville and Chattanooga Railroad, at Sparta, to the Bon Air coal fields, will cost $20,000 per mile. No definite arrangements have been made by the coal company with the Nashville and Chattanooga road for the construction of the new line, but it will certainly be built.

THE gross earnings of the Norfolk and Western Railroad Company for October were $331,854, the expenses $139,903, and the net earnings $191,951, being an increase as compared with the corresponding months last year of $39,321.

AT the annual meeting of the Old Colony Railroad, held at Boston, on the 27th ult., the old board of directors were unanimously reëlected, as were also president Choate and vice-president Ames.

ALEXANDRIA, Va., Nov. 28.—The Board of Directors of the Norfolk and Western Railroad Company, met at Alexandria, Va., on the 28th ult. The company has had under consideration for some time the expediency of building warehouses, coal piers, etc., upon the property controlled by it at Lambert's Point, Norfolk; also extending its New River Division to open up new coal mines, and the building of branch lines into the important mineral districts adjacent to its line. The question of making financial provision to enable the company to undertake these works having been referred to a special committee, the meeting held to-day was for the purpose of receiving the report. The committee submitted a statement setting forth the beneficial results of the policy adopted by the company in building up its local industries, and reporting in favor of the further extensions and improvements that are now deemed requisite. In order to secure the necessary means, the committee recommended that the company issue $2,500,000 improvement and extension bonds, secured by a mortgage upon the property, and submitted a proposition to the company from a syndicate of bankers, headed by Messrs. Drexel & Co. and E. W. Clark & Co., of Philadelphia, for the purchase of the bonds on terms which it recommended should be accepted. The board unanimously concurred in the report and recommendations of the committee, the sale of the bonds was confirmed, and the President was authorized to undertake the work of construction and improvement.

HARRISBURG, Penn., Nov. 27.—A charter was granted on the 27th ult., at Harrisburg, Pa., to the Cherry Grove and Hickory Valley Railroad Company, the line of which will run from near Garfield, Warren County, to West Hickory, Forest County, a distance of twenty miles. The capital of the company is $120,000. L. R. Freeman, of Warren, is president.

BOSTON, Nov. 21.—The annual meeting of the Boston and Providence Railroad was held to-day, President Whitney presiding. The report of the Auditing Committee was accepted. W. G. Russell, J. Warren Smith, and H. F. Burrows, of Attleboro, were appointed on the Auditing Committee for the ensuing year, the last named being chosen to fill the vacancy caused by the death of J. A. Haws. The President explained that measures would be taken during the coming year to improve the terminal facilities at Providence. The election of Directors then took place, the whole number of votes cast being 55, and of shares represented, 4,809, all of which were for the following: Henry A. Whitney, Thomas P. J. Goddard, J. Huntington Walcott, William R. Robeson, Francis M. Welde, Joseph W. Balch, Royal C. Taft. At the close of the meeting the Directors re-elected the officers of last year.

BOSTON, Nov. 21.—The stockholders of the Little Rock and Fort Smith, and of the Mississippi River and Texas Railways are offered the right to purchase bonds and stock, which latter will be issued as full paid stock in the Little Rock Junction Railway and Bridge Company. The amount allotted to each company is $200,000 bonds and $200,000 stock. The proportionate amount which all the stockholders of each company have the right to subscribe for is approximately the one-twentieth part of the amount of stock held by each in the stock of either company.

RICHMOND, Va., Nov. 31.—The annual meeting of the stockholders of the Richmond, Fredericksburg and Potomac Railroad Company was held here to-day. President J. P. Brinton's report shows the gross revenues of the road to be $470,580; the expenditures $276,179, and the net revenue, after deducting the interest on the bonds and loans, and the dividends on the guaranteed stock, $102,216, an excess over the net revenue last year or $25,376. The reports of the other officers show the road to be in a flourishing condition, financially and otherwise. Col. J. P. Brinton was reëlected President, and the following Directors were elected: Charles Chauncey, A. Sydney Biddle, J. S. Blackburn, and Dr. F. T. Willis.

THE estimated earnings of the Elizabethtown, Lexington and Big Sandy Railroad Co., for the month of November, 1883, were $60,503.28; for corresponding period in 1882, $61,188.33, showing an increase in 1883 of $685.05. From January 1 to November 30, 1883, the increase over the corresponding period of 1882, was $181,796.32.

THE estimated earnings of the Chesapeake and Ohio Railway Co., for the month of November, 1883, were $335,261,96; in 1882, 300,732.14; increase, $34,529.82. The earnings from January 1, 1883 to November 30, 1883, were $3,590,363.37, being an increase over the same period of 1882 of $508,742.18.

THE Philadelphia, Wilmington and Baltimore Railroad Company declared a semi-annual dividend of 4 per cent. on the 27th ult.

MEXICAN NOTES.

Gleaned from exchanges.

OUR railroad exchange, *The Mexican Financier*, reports that the railway companies find one of their greatest troubles in the stealing of the spikes that fasten the rails to the ties. The thieves have a way of prying out the spikes with levers, and sometimes rob a considerable piece of track of every spike. The rails are thus left loose, and should a train come along before the theft be detected it would surely be thrown from the track, bringing about a horrible disaster. The utmost vigilance in watching the track has to be maintained to prevent such an occurrence, but even the greatest care cannot always avail, for the thieving might be done just before the train comes along, leaving no time for the inspection of the track by the section hands.

THE same journal remarks on the results which will follow the development of the Mexican railway system. It anticipates a flourishing future for Aguascalientes, and proceeds to say: "Other cities at important railway junctions will become fine business points, while throughout the country the large towns along the railway lines will enjoy a flourishing growth as trade increases and industries are developed, through the impulse given by the quick and cheap communication afforded by the railways. And with the establishment of railway connection with the interior, the ports along the coast will increase in importance. Tampico, Túxpam, and Minatitlan on the Gulf, as well as Vera Cruz; and Guaymas, Mazatlan, Manzanillo, Acapulco and Tehuantepec on the Pacific, will all be seats of commerce, more or less large and important according to the nature of their lines of communication both at sea and ashore."

OUR contemporary is of opinion that the commercial supremacy of the capital city will be maintained, and thinks "it is likely that Guadalajara, surrounded by a rich and populous region, will continue the second commercial city of the Republic. There are indications that San Luis Potosí will also become a great business center, from the advantages which its accessibility from the Gulf over the Mexican Central's line from Tampico will give it, together with the junction with the same at that point of the main line of the Mexican National, and its branch to Zacatecas."

THE interesting journal to which we are indebted for our Mexican notes in the present issue, so far, reports that the main line of the Mexican National has reached the important city of San Miguel de Allende, in the State of Guanajuato, on its way from Acámbaro to San Luis Potosí. San Miguel de Allende has about forty thousand inhabitants, and considerable manufacturing is done there. The only station between Allende and Celaya is Soria, where a large factory, owned by Mr. Gonzalez, of Celay, is situated. Considerable business is expected at these two points. Work on construction will be suspended on this part of the line for the present, and it is thought that possibly hereafter all the building may be done down from the northern end, owing to the expense of transporting material to this end. It is expected that the junction with the Mexican Central at Celaya, instead of bringing the two roads into opposition at that point, will prove a great benefit to both, as they will be made mutual feeders to each other, bringing each other a large amount of business. It is likely that the project for a union station and freight depot at the junction, instead of the two stations now a considerable distance apart, will be realized.

ONCE more from the *Financier:* "The Mexican Central has settled the important question of water along its line between Chihuahua and Lerdo. At Lerdo water was reached at a depth of twenty-four feet, and at other stations at depths varying from 30 to 128 feet. All along the line of the road are millions of acres of finely grassed country, but hitherto deemed worthless for want of water. All that will have to be done now, however, to make them immensely valuable for stock-raising is to sink wells and put up wind-mills. The cattle-raising interests of Northern Mexico are destined to great importance."

AT the present rate of construction the two ends of the Mexican Central track will meet in January next.

THE *Chihuahua Enterprise* praises the efforts made by the southern States of Mexico to induce immigration. It says that the result is a settlement and development of the country in that section, of astonishing rapidity. The northern border States should make the same efforts and secure not only American but English and German emigrants to locate here. While Chihuahua is taking the lead in many things, in this direction she is behind her sister States.

THE total railway mileage of Mexico is 2,879 miles. It is mainly an extension of the railroad system of the United States.

VENNOR, the meteorologist, predicts that January will be warm. Prepare for Arctic weather.

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NEW YORK, DECEMBER, 1883.

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The President's Message.

THE President has issued his annual message, and it is now before Congress and the people. It has been received on the whole, so far as we can learn, very kindly, and while some are ready to object to certain portions, yet taken in its entirety they are willing to concede that it is a thoughtful document.

The President's attention has undoubtedly been called to some of the schemes of certain railroad officials which seem to have given him serious thought. In his message therefore, we read the following words:—

Complaints have lately been numerous and urgent that certain corporations, controlling in whole or in part the facilities for the interstate carriage of persons and merchandise over the great railroads of the country, have resorted in their dealings with the public to divers measures unjust and oppressive in their character. In some instances the State governments have attacked and suppressed these evils, but in others they have been unable to afford adequate relief, because of the jurisdictional limitations which are imposed upon them by the federal constitution. The question how far the national government may lawfully interfere in the premises, and what, if any, supervision or control it ought to exercise, is one which merits your careful consideration. While we cannot fail to recognize the importance of the vast railway systems of the country and their great and beneficent influence upon the development of our material wealth, we should, on the other hand, remember that no individual and no corporation ought to be invested with absolute power over the interest of any other citizen or class of citizens. The right of these railway corporations to a fair and profitable return upon their investments, and to reasonable freedom in their regulations must be recognized; but it seems only just that, so far as its constitutional authority will permit, Congress should protect the people at large in their interstate traffic against acts of injustice which the State governments are powerless to prevent.

The President evidently realizes that the railroads of the United States have been instrumental in developing large tracts of country, and of adding largely to its resources. There can be no question in his mind but that the railroad has been the great civilizing power in the country, bridging time and distance by the iron horse so effectively that the continent is spanned inside of seven days. Whatever there is of good in the East, is thus rapidly brought in contact with what is good in the West, and this rapid interchange of people and ideas goes far toward eliminating the evil and increasing the good. But at this point we must stop, for in this great civilizing power itself the President finds cause for alarm. Of what then is this great power, so famous for developing the country and civilizing the people, guilty? There can be but one answer. They who are guilty at all, are guilty of robbing the country they have developed, and of robbing the people they have helped to civilize. We are well aware that the railroad power in these United States, with one exception, is the most far-reaching and successful in carrying out its desires. It is claimed in political circles that it can place a man on the bench of the Supreme Court, that it can have a majority in the halls of Congress, that it controls legislation in those States where its chief interests are centered, and sometimes even elects the Chief Magistrate of the nation. Now, if the above indictment is true, the charge of robbery must also be true, as to accomplish the above and pay dividends to stockholders requires more money than can be legitimately earned.

There can be various ways in which this robbery may be accomplished. Through their members of Congress they can receive large grants of land; through their legislators pecuniary aid from the different States through which their railways pass. They can place their bonds on the market, and when these are sold, place their preferred stock, and then their common stock. Or they can place their common stock at the same time they do the bonds, to be followed by the preferred stock. When all is placed that there is money to be invested in, it is an easy matter to default on the interest and foreclose the mortgage, and have the road sold to the highest bidder. By this method the stockholders who have invested their money are frozen out. We have heard it stated that this freezing out process has been successfully applied on several roads. Not having any personal knowledge, we do not claim that the railroad power is guilty of any of the above, but we simply state the above to show how easy a matter it is for the great developing power of our country and civilizer of our people to rob the National Government, State Governments, and the people collectively and individually.

We are glad for the words of our President calling attention to this power, and trust that good to the people and honest profit to the railroads may follow as the result.

BANKRUPTCY.

THE first session of the Forty-Eighth Congress has begun, and no doubt with plenty of work for it to accomplish. We have no desire to meddle with politics or religion, nor do we deem ourselves sufficiently wise to map out the work for the highest body in our land. We recognize the fact that life is not long enough to learn more than one trade well, and while we follow the avocation of journalists, we do not intend to set ourselves up as legislators. We can, however, so far as we know it, voice the sentiment of the people, and thus perhaps be of some service to those who are elected to frame our laws. We believe that we are giving utterance to the desire of the respectable part of the business world, when we ask the present Congress to give the United States a uniform Bankruptcy Act. There may have been a time when a uniform Bankruptcy act was not necessary, but that time is not now.

To-day the purchases of a buyer are not confined to any one State. He is in every market, and buys his goods where they are offered the cheapest, quality being the same. To-day a man's customers are not the residents of one State, but are scattered from the Atlantic to the Pacific, from the Lakes to the Gulf—in every State, county, city, town and hamlet where a traveling salesman or a circular can reach. Where trade is so extended it is impossible for a party doing a large business to protect himself in case of accident or fraud on the part of his customer, with the number and nature of the State Bankruptcy Laws now in force. In some States the creditor nearest to the bankrupt debtor can take advantage of the "grab" law and make himself whole, while the equally deserving far away creditors are obliged to take a few cents on the dollar. In other States a fraudulent debtor can fail, and by preferring his wife, father, uncle, or some other one in his ring, so cover his property that his creditors cannot touch it, and thus defraud them out of every cent, and under another name or his own name as agent, start in business again with his ill-gotten gains. Even thieves and cut-throats will acknowledge this to be a wrong state of affairs, even while they are willing to take advantage of it, and if this is so, the high-toned portion of the business community must be intensely shocked. It is now proposed to petition Congress to put an end to this condition of affairs by passing a uniform Bankruptcy bill. A large and influential body of men, composed of the ablest bankers and merchants in Boston and New York, have united to ask for the passage of what is known as the LOWELL Bill. This now well known Bankrupt Act was prepared a few years ago by the HON. JOHN LOWELL, United States Circuit Judge, and the years of study since given to it have only served to convince those who have given it this study, that we can do no better than have the same adopted as the Bankrupt Act of the whole country. It is impossible, with the flood of matter crowding for utterance in this JOURNAL, for us to spare the necessary space, or we would publish the Act in full for the benefit of our readers. Any party wishing a copy, however, can probably obtain the same by addressing the New York Board of Trade and Transportation, New York City. For the benefit of those who, like ourselves, are pressed for time, we will give an analysis of the Bill, as prepared by MORRIS S. WISE, ESQ., counsellor at law, New York City, in his explanatory note preceding his comparison between the Act of 1867, the LOWELL Bill, and the ENGLISH Act of 1883.

The interesting and valuable features of this Bill will be apparent on inspection; it overcomes the objectionable features of the late Act of 1867, and it has been most carefully drawn to avoid many of the intolerable evils which existed under the former law and which led to its repeal.

For instance: the abolition of the fee system of remunerating officials and their compensation by the payment of salaries will cause the expedition of the proceedings, which were formerly delayed intentionally to enable the officers in charge to enhance their fee bills.

The powers of the commissioners acting as ancillary judges have been enlarged for the accommodation and protection of suitors, especially in sparsely settled districts; and in those districts where the business does not warrant the maintaining of extra court machinery, the judge himself will perform the labor of the commissioner.

The trustees must account more expeditiously, and the estate must be wound up more rapidly than before.

No expenses can be incurred save by sanction of a committee of direction elected by the creditors.

The entire proceedings are placed under the watchful care of a new salaried officer, termed a supervisor, whose duty it is made to guard the interests of all concerned by detecting wrong doing or omission of duty, and reporting the same.

The composition clause may be studied with profit, and it will be found

to contain many novel and highly just, as well as practical arrangements, all tending to protect the rights of creditors as well as of honest debtors.

Discharges cannot be obtained in the easy, slipshod fashion that characterized them under the former law, and the section devoted to crimes and their punishment has been framed to successfully overcome the constitutional objections urged against the former provisions on the subject

In brief, the Lowell Bill has been drawn upon the just theory that the honest creditor should be protected, the dishonest debtor punished and the honest, though unfortunate one relieved from mercantile disaster, and restored to a position of usefulness in the business community. A perusal of this analysis will recommend the proposed law more efficaciously than any eulogium possibly can. The work has been performed by an experienced and able hand, and as such it is its own best eulogy.

THE CURRENCY.

THE rapid reduction of the public debt, which began some years ago, has now reached a point where it forces another problem on our attention, the question of our currency. For some years we have had the best system of supplying currency known to the people of the United States. The United States being borrowers, issued bonds for the money borrowed. The National Banks wishing currency, were obliged to buy these bonds, and then deposit them with the United States Government as security for their circulation. Thus for every dollar of circulation put out by a National Bank, the United States Government held ample security in its own bonds which were the bonds of the people, secured by the property of the people. The advantage of this system of currency over that issued by the old State Banks consists in the fact that a dollar bill from an Eastern bank is worth just as much out West as the bill of a Western bank, and vice versa. In a word, a dollar bill, no matter in what part of the United States the bank issuing it is situated, is worth a dollar in all parts of the United States. This was not the case in regard to the currency issued by State banks. The value of this currency varied according to locality; that issued in some localities depreciating five or more per cent., until we reached the grade denominated "wild cat."

Another advantage of the present over the former is, that a man never has to worry himself whether the currency in hand is the circulation of a sound bank, or one that has failed. The circulation being secured by a deposit of bonds at Washington, secures the holders of National currency against all losses, no matter how bad and rotten the bank issuing the same may be. In former days, when a State Bank failed, its circulating medium became worthless as such, and the unfortunate holder became a creditor of the bank, and in the process of liquidation might receive par or might receive a per cent. There are other reasons why we have an affection for the present system of currency, but if there were no other than the two above given, they are enough to make us pause when any prospect of a change is at hand.

The rapid reduction of the public debt has now brought us to the almost immediate prospect of a change in the currency system, and the great question is, what shall the change be? We certainly do not wish to go back to such a state of affairs as existed before the National currency, and we hardly know what other plan can be devised that will be an improvement on the present, or its equal. If we are certain that we do not wish a return of the old State Bank currency, we are just as certain that we do not wish to be loaded down with gold and silver coin. We want gold to be the standard medium, but much prefer to handle what represents it than the article itself.

For the public good, we hope that our wise men, when in Congress assembled, will devise some plan to relieve the banks and let the currency remain as it is, or else introduce some new circulating medium in the shape of Treasury notes. It will not hurt any one, except the owners of a few silver mines, if Congress will give us back our fractional currency as well. The people of the United States can get along without gold and silver better than with it, as long as they know that what they carry in their pocket-books will produce gold and silver on demand.

NOTHING remains to be said abont the change of time, of which all essential particulars have been already given. In New York, the lengthening of Sunday the eighteenth ult., by turning back the timepieces at noon, three minutes and fifty-eight seconds, gave watchmakers the opportunity of special advertising, and wits that of a new joke or two. To the traveling public, which indeed is the public at large, the innovation, affecting the almost entire railway system, is proving a great convenience. Greater simplicity in the arrangement of time is a step in advance, aptly characteristic of a progressive and busy people.

THE success which attended the Carnival Week in Montreal last January, and the enjoyment afforded by the Canadian winter sports as witnessed by thousands of visitors from all parts of the continent at that time, have induced the organization of very influential local committees to repeat the carnival this Winter. February 4 will be the first day of the week appropriated to this interesting festival, arrangements for which render it certain that the coming will exceed the past one in all its features.

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THE *Artisan*, Nashville, Tennessee, is perfectly welcome to whatever satisfaction it may derive from the fact that, by a slip of the pen, we did "locate" Nashville in Kentucky instead of in Tennessee.

Financial.

WE noticed during the month of November a moderate activity on the bull side in the stock market. This movement was however of short duration, and apparently has left the market in a duller condition than it was before. The month has certainly been one of easy money, so far as abundance and rates on approved collaterals are concerned. We believe that the crop movement, both in cotton and grain, has been quite large, and yet the necessary demands from the West and South to move crops has not been felt to any great extent here, or else we would find an increased rate on call loans.

There is no disputing the fact that money remains very abundant, not alone in the money centers of our own country, but in foreign countries as well. Men acquainted with the ruling passion of capitalists for gain, can account for this condition only by accepting one of two reasons: either the capitalist has become virtuous, or else has become thoroughly frightened. As we do not lean to the theory of the leopard changing his spots at will, we are obliged to accept the latter reason of the capitalist being thoroughly frightened. We see no good reason why he should not be frightened, when we take into account that for two or three years back there has been a gradual decline in the market price of his favorite securities. Many times during that period the financial articles in our daily papers have prophesied that the bottom was reached, and in less than six months after their prophecy, have been brought to face a price still lower. Many believe to-day that we are at the bottom; but who knows? All the prophecies of the past two years have been failures, and the prophecy that we are at low water mark to-day may be a failure also. We opine to the belief that the time to buy is on a rising market, and the time to sell is on a falling market. A man can afford to buy at a price above low water mark when the stock purchased is advancing in price. He certainly can afford to sell on the first turn of the stock downward, for in nine cases out of ten the first loss is the smallest. We notice that the banks are using a little extra caution in their dealing with their customers, when notes for discount are presented to them. This is natural, but when overdone exceedingly unwise. Because banks have been careless and become flooded with worthless paper, the makers of which have failed, is no reason why firms that are solvent should be denied their customary accommodation. Such a course is like locking the stable door after the horse has been stolen, and may result in producing more failures in cramping concerns that otherwise would remain solvent. We do not hesitate to pronounce this action on the part of some of the banks as being very unwise, and in some instances reprehensible. The true course for them to pursue is to be always careful, as institutions to whom are committed great trusts. If banks will discount for their own profit and their customers' legitimate wants, giving accommodation notes a wide berth, they will, in a term of years, make more money and have a less number of failures to disturb them.

We are informed on very good authority that some trades are complaining of an accumulation of stock on their hands. We have known for some time that many persons in business were buying only from hand to mouth, and it seems strange that in face of such an existing fact, any trade should go on and over-produce. The next step under these circumstances will be a reduction in wages or a stoppage of manufacturing. Then the country will be flooded with labor *vs.* capital literature, and strikes and lockouts will be the order of the day.

We cannot forecast the future, the gift of prophecy being denied us, but one thing we can solemnly affirm, that until confidence be restored the present condition of affairs cannot improve. As confidence is a plant of slow growth, and has been nipped so many times by railroad and mining ventures foisted on the community by men of good reputation but no character, we have the impression that the future for many of us will be uphill work.

Our Railways and Our Industries.

THE past thirty days have been perhaps the most important in the iron trade for two years. On Saturday, December 8th, the Homestead Steel Rail Mill, near Pittsburgh, closed down, and on December 15th, the Edgar Thomson Works will, according to announcement, follow suit. A rumor prevails, to the effect that one or two other mills will close down, owing to the lack of orders and the backwardness of railway builders in engaging in new enterprises at this time, or contracting for Spring and Summer deliveries. Heretofore it has been the custom of railway builders to contract ahead from six to nine months, but the conditions of the steel rail market, and the requirements of the country have so materially changed, that the policy of ordering for future delivery has been, to a great extent, discontinued. At present cost, there is but little profit at a selling price of $35. There are now inquiries in hand for upwards of 100,000 tons, and offers range from $30 to $34. But unless a further reduction in wages should be made, and more skilled labor dispensed with, it is not probable that rails will be sold below present asking prices for some little time to come. The rail making capacity is far in excess of the requirements now in sight. But a careful review of the projected mileage, shows that a large amount of railway material will be wanted next year. The dullness of the demand for rails for some time past is due more to the probability of a drop of $5 per ton in the price of rails, than to lack of requirements for the material. Transportation facilities are still required on a large scale. Within thirty days, announcements have been made of the contemplated construction of from 2,000 to 3,000 miles of road. Eight hundred miles of this is projected in the Southwest, through New Mexico and Colorado, for the purpose of developing a territory now devoid of railway facilities. A new line, which will, when completed, practically result in another trunk line, is proposed, between New York and Chicago, making the distance from the Hudson ferries to the Chicago Exposition, 806 miles, all except 260 miles of which is already finished and in operation from Chicago to Chicago Junction. The distance is 271 miles in a bee-line, with easy grades, by the Baltimore and Ohio. From Chicago Junction to Akron, O., the new road will be from sixty to sixty-five miles. From Akron to New Castle it is seventy-five miles, and from New Castle to Milton, on the Susquehanna, the western terminus of the Reading system, it is exactly 180 miles, but the road will be 200 miles long, on account of the topo-

graphy of the country. From Milton, by the Reading, it is 125 miles to Easton on the Delaware, and from Easton to Jersey City pier, seventy-five miles. This new road would be under the control of the B. & O. system, and come into competition with the Pennsylvania, the Erie, and other lines having a Chicago outlet. This fact is referred to simply as an indication that railway builders do not consider that the eight lines between New York and Chicago are too much; on the contrary, it is said that there are influential parties in railway circles who intend to build this additional line. Rumors of the same character are current as to the projected construction of lines in other localities in which, according to all appearances, there is but little need of additional facilities. Railway builders expect to obtain steel rails for next Summer's work at $30 per ton, and with a corresponding decline in other kinds of railway material and appliances, it would not be saying too much to assert that there would be considerable railway activity during the coming year, stimulated in part, by the low price of material, as well as by the natural and legitimate increase in traffic.

The iron trade throughout the country is dragging along slowly, uncertain whether to still further restrict, or to continue production, in view of the possibility of an improvement within ninety days. The iron trade is strong and confident; it has overcome many obstacles, and it has still great faith in the growth of the country; it looks for development North and South, and in the expanding requirements that must follow that growth. Hence, capital is ready to be invested, and only waits for a favorable opportunity to enter some of the many new enterprises looming up.

The mills engaged in making construction iron and iron for engineering purposes, are nearly all busily engaged, very few being short of orders, and a large amount of business is in sight. The bridge works are especially busy; locomotive works are doing a fair amount of work. Here and there rumors prevail as to declining activity and financial troubles. With finished iron at 1¾ to 2c. per lb., construction iron at 2¼ to 4c. per lb., steel rails at $30 to $35 per ton, pig iron at $17 to $20, and steel in proportion, it is quite reasonable to expect an earlier improvement than would be possible were it not for these very low prices.

The coal and coke interests are suffering very little as yet from the depressing influences at work in other directions. The anthracite coal interests have mined, so far this year, nearly 30,000,000 tons, but have found a nine to twelve days restriction a necessity, in order to prevent the weakening tendency which has been threatened in prices for a month past. The coal combination is strong, and able and determined to hold prices about where they now are. The policy of opening up new markets has strengthened prices, and will continue to do so. The bituminous coal fields are being developed with wonderful rapidity, but it is doubtful whether the capacity can be profitably engaged next year.

New roads are being pushed into mineral territory in Pennsylvania, Ohio, West Virginia, and through several of the Southern States, which will result, if in nothing else, in a gradual diversification of the industries which have been heretofore confined to Pennsylvania and Ohio. Blast furnaces are projected in Virginia, West Virginia, Tennessee and Alabama. The fact that large quantities of iron are being shipped from those States to Northern markets, in competition with Pennsylvania and Ohio irons, is warning capital that a new source of competition is at work, and this warning has been taken. Northern manufacturers are taking the bull by the horns, and investing money in Southern properties, mines and railways, and like the British manufacturers, transferred their capital to fields where it will be best able to compete with the new economic forces.

The American railway system is changing the conditions which control, stimulate, or depress the industries. This system is opening up opportunities in remote sections; manufacturing resources are being developed with a rapidity which is alarming to the conservative sentiments of those who have become, for generations past, accustomed to believe that Pennsylvania was the keystone State, not only in a political sense, but as a manufacturing center. It is no longer so. Alabama is rapidly coming to the front; Virginia will soon be a leading pig iron producer. Foundries, mills and shops are springing up all over the South. The textile interests are rapidly expanding their investments, and are still very strong, as shown by the dividends declared.

The substitution of coke for coal, and of natural gas for both of these, is making fresh possibilities, and opening up room for enterprise, through the resulting competition growing out of the economies developed; manufacturers at points remote from coke and natural gas fields, are considering the possibilities of obtaining natural gas fuel. The construction of pipe lines, from 100 to 300 miles in length is seriously contemplated, and after what has been accomplished in recent years, it is quite safe to say that some of these schemes for transporting natural gas long distances, will be realized within twelve months. The question of cost has not yet been practically determined, but sufficient inducement exists to warrant the investment of a large amount of money in these schemes.

IT is reported that the Dominion Government refuses, contrary to expectation, to guarantee three per cent. interest on the total capital stock of the Canadian Pacific. It has agreed to give twenty-five million dollars as a subsidy to the road, and a land grant of twenty-five million acres, and to exempt from taxation, forever, the real property and stock of the company. The reader will remember that the proposed terminal point of the road on the Pacific coast is Victoria, Vancouver's Island. In 1880 a contract was made by the Dominion Government with John S. Kennedy, of New York; Richard B. Angus and James J. Hill, of St. Paul, Minn.; Morton, Rose & Co., of London, and John Reinach & Co., of Paris, forming an incorporated company known as the Syndicate Construction Company, for the construction, ownership, and operation of the Canadian Pacific Railway. The company increased its capital stock from twenty-five million to one hundred million dollars, and a guarantee of three per cent. on this amount was asked of the Dominion Government, and, as is stated, has been refused. There is, however, a probability that a guarantee will be given up to a certain figure. If the above report should prove true, the completion of the line must be indefinitely postponed.

TO BE proud of learning, is the greatest ignorance.

Our Canadian Letter.

From Our Special Correspondent.

OTTAWA, December 4, 1883.

AS THE date fixed for the opening of the House of Commons, 17th prox., is fast approaching, numerous bills affecting railways are being entered at the office of the Clerk of the House.

The bondholders of the St. Lawrence and Ottawa Railway Company will apply to Parliament next session for an act enabling them to vote at all meetings of the shareholders, on the election of directors, and in the transaction of all other business upon which shareholders have a right to vote, and with or without the registration of such bonds; also to empower any judge of the High Court of Justice of Ontario, upon the application of bondholders to the extent of one-third of the amount of the total issue of such bonds, to order a sale of the whole of the property and undertaking of the company, and to vest in the purchaser all the franchises and statutory rights of the company, free from any lien or interest of the shareholders, and to vest in a receiver the money arising from such a sale, to be applied in payment of claims of bondholders, and the residue for the benefit of creditors and shareholders.

The Canadian Pacific Railway Company give notice that they will apply for power to purchase, construct and guarantee the securities of branch lines.

Hugh Sutherland and others of Winnipeg, will apply for assistance to incorporate the San Fancisco, Winnipeg and Hudson Bay Railroad Company.

The Railway Trust and Construction Company will apply for an amendment to their charter.

The Manitoba and Southwestern Railway Company will apply for an extension of the period for the construction of the road, and for authority to sell or lease it.

The Atlantic and Northwestern Railway Company will apply for sanction for its arrangements with the Canadian Pacific, and Ontario and Quebec Railway Company.

The Canadian Pacific is involved in two heavy legal suits. The celebrated case of McLaren *versus* this company, involving a hundred thousand dollars, is to be appealed by the defendants from the Supreme Court of Canada to the Privy Council of England. Allan Grant, an extensive lumberman, is suing this company for breach of contract. An argument in the case was concluded a few days ago at Osgoode Hall, Toronto. Decision reserved. Plaintiff last year contracted with the company to convey a large quantity of square timber from this city to Quebec, he to find men and the company cars for transhipment. Defendants neglected to furnish the cars at the time specified, and when the timber reached Quebec the market had fallen, whereby the plaintiff alleges that he lost over fifty thousand dollars. The claim was not allowed at the trial of the case here, and application is now made to set the judgment aside.

Much interest is manifested throughout Ontario in the construction of the Ontario and Quebec Railway, which will be opened for passenger traffic by May next. This new road, which is constructed by the C. P. R., will give that corporation a through line from Toronto to Montreal. The C. P. R., would, on completion of this new road, have an advantage over the Grand Trunk in point of distance, but the latter on the first of next month takes control, it is said, of the Midland Railway, which will put it on an equality with the C. P. R. The construction of the Midland is proceeding tardily.

The Kingston and Pembroke Railway, a new line running from the former place on the G. T. R. to Renfrew, on the C. P. R, passing through a valuable lumber and mineral country, will be completed next spring. It is now open for traffic as far as Calabogie Lake, a distance of twenty miles from the terminus.

The Jacques Cartier Railroad short line between Lachine and Montreal, will be completed next week.

The reports of the G. T. R. and C. P. R. entering into compact for better arrangements with regard to rates, has been denied by the former, but not by the latter. There is, however, a latent impression abroad that such arrangements have been entered into.

The final meeting of the Board of Directors of the Credit Valley Railway was held a few days since in Toronto, when an agreement was authorized to be executed; also the deed of amalgamation with the Ontario and Quebec Railway.

As the result of a recent test, the C. P. R. Co. is receiving regular supplies of coal from the Saskatchewan mines.

The C. P. R. syndicate is under a dark cloud as regards the northwestern division. A wholesale reduction in the wages of the employés has just been effected. Yesterday machinists were reduced forty cents per day; laborers, twenty cents; carpenters, thirty-five per cent per month. In the stores department laborers were reduced to $1.50 per day.. Office hands, hertofore getting $55, only get $50 now. In consequence of the reduction, the boiler-makers went out on a strike, and a general strike is imminent. The plea of the syndicate for the reduction of wages is the tremendous outlay of expense and its meagre receipts. The reduction has not affected the Eastern division, where the receipts are large. At a convention of farmers of the Province of Manitoba, held at Brandon a short time ago, the syndicate and the Government came in for a severe overhauling, notwithstanding that representatives of the different political parties were present at the convention. At this gathering the Manitoba and Northwest Farmers' Union was organized. Besides denouncing the present customs tariff, the following resolutions were passed: "That the interests of the settlers of this Province peremptorily demand that the right which, under the R. N. A. Act, it possesses in common with every other Provence in the Dominion, of chartering companies to build lines of railway within its own bounds, should be exercised to its fullest extent. The baneful effects of railway monopoly call loudly for the active and persistent exercise of all the powers of the people to maintain their rights, and to resist to the utmost every act of arbitrary interference with them. That the natural outlet for the Province of Manitoba and the Northwest is through the Hudson's Bay, and the great rivers and lakes tributary to it. The feasibility of this route having been proved by two hundred years of constant navigation by the ships of the Hudson's Bay Company, and by the voyages of the New England whalers for the last thirty years, the interest of the Northwest demands the construction at an early date of a railway connecting the present railway system with a port in the Hudson's Bay. To attain this object it is the

duty of the Dominion Government to grant the most liberal assistance.

"That we feel the present arrangement presented by the C. P. R. for the shipment of grain, an exceedingly unsatisfactory one, and highly detrimental to the farmers and to grain buyers of limited means, inasmuch as the C. P. R. prohibits the erection of any elevators but those of costly description that involve the investment of considerable money, thereby placing the shipment of grain in the hands of a few capitalists."

The concluding resolutions were read:

"That, failing to secure any of the above, we petition to be released from Confederation;

"That in the event of the latter alternative being a failure, we take such steps as may be thought advisable for becoming an independent Province."

Chicago and Northwestern Railway.

THE earnings of the Chicago and Northwestern Railway Company for the years ending May 31, 1882 and 1883, were as follows:

	1882.	1883.
From first-class passengers	$ 3,353,768 63	$ 3,802,737 56
From second-class passengers	712,582 15	885,132 87
From excursion passengers	786,888 94	1,063,068 73
From commutation passengers	308,159 82	352,274 79
From parlor cars	10,023 65	16,401 80
From freight	17,393,098 17	16,749,055 51
From transportation of milk	132,036 02	145,296 24
From express matter	361,547 99	411,600 19
From United States mail	431,584 19	421,150 44
From extra baggage	34,497 57	48,091 75
From miscellaneous	160,469 06	187,024 44
Total earnings	$23,684,656 19	$24,081,834 32
Operating expenses:		
Repairs of roadway and track	$2,518,320 34	$2,278,838 75
Repairs of bridges, culverts, etc	440,408 70	552,739 95
Repairs of buildings, fences, etc	615,690 61	541,416 52
Repairs of locomotives	805,852 58	928,467 54
Repairs of passenger cars	285,897 10	510,744 33
Repairs of freight cars	694,390 91	882,887 60
Telegraph expenses	221,322 93	281,047 02
Agents, clerks and laborers	1,734,346 97	1,867,641 95
Passenger conductors, baggagemen and brakemen	214,193 25	267,003 57
Freight conductors and brakemen	548,037 24	608,257 36
Engineers, firemen, wipers, etc	1,194,013 10	1,331,613 48
Salaries of general officers and clerks	147,558 27	152,614 80
Outside agents	98,932 73	135,895 31
Advertising	68,881 49	80,259 62
Fuel for locomotives	1,598,382 97	1,937,295 05
Oil, waste and tallow	188,925 51	215,670 41
Water supply	78,173 86	90,718 87
Passenger train supplies	38,453 45	55,621 02
Freight train supplies	22,180 11	26,511 68
Station supplies	68,245 00	101,594 61
Stationery and printing	105,612 09	109,607 92
Contingencies and miscellaneous	109,048 20	111,571 35
Loss and damage	205,514 26	207,177 77
Insurance	837 50	941 78
Law expenses	55,267 62	64,506 28
Mileage of passenger cars	7,696 85	8,105 86
Mileage of freight cars	50,892 08	104,380 84
Taxes	522,558 39	618,785 12
Total operating expenses and taxes	$12,639,634 11	$14,072,516 36
Net earnings	$11,045,022 08	$10,009,317 96
From which deduct:		
Interest on bonds	$3,999,208 94	$4,288,633 05
Sinking fund accounts	98,120 00	98,120 00
Rent of leased lines	1,569,618 00	1,570,948 27
	$5,666,946 94	$5,957,701 32
Net income	$5,378,075 14	$4,051,616 64
During the fiscal year ending May 31, 1883, four quarterly dividends of 2 per cent. each on the preferred, and two semi-annual dividends of 3½ per cent. each on the common stock were paid, amounting to		2,890,336 52
Leaving a surplus of		$1,161,280 12
The balance of income account on the 31st of May, 1882, was		7,264,581 51
Total to credit of income account, May 31, 1883		$8,425,861 63

The net earnings of the year were 10.34 per cent. on both kinds of stock, and the large surplus, after payment of current dividends, was expended in promoting the value and efficiency of the property.

Compared with the previous year, there was an increase in gross earnings from passenger business of $948,192.56, from express $50,052.20, and from miscellaneous $40,149.56; with a decrease in earnings from freight of $630,782.44, and from mails of $10,433.75—making the total increase $397,178.13. The increase in operating expenses was $1,336,655.72, in taxes $96.226.73, in interest on bonds $289,424.11, and in rental of leased lines $1,330.27—a total of $1,723,636.63. The decrease in net income was therefore $1,326,458.50.

The ratio of operating expenses to earnings was 55.87 per cent., and, including taxes, 58.44 per cent., against 51.16 and 53.37 respectively for the preceding year.

An examination of the traffic of the different divisions of the road show that there was an increase from the Madison, Winona and St. Peter, Dakota and Northern Iowa divisions of $1,515,419.06; while there was a decrease in the earnings of the Wisconsin, Peninsula, Galena and Iowa divisions of $1,118,240.93; the difference ($397,178.13) constituting the gain in total gross earnings.

The favorable increase in traffic on the new roads in Dakota, and the main lines leading thereto, and on the Northern Iowa division, as shown above, is attributed to the active settlement and development of the cheap lands of the Northwest.

The increase in operating expenses, which, it will be observed, is almost identical with the decrease in net earnings, was caused by the additional number of miles of road operated, and by the unusual severity of the winter on some of the lines. The item of taxes shows an increase of 18.41 per cent.—which, the report says, is "an additional burden imposed by public authority, but not justified by the results of the year."

During the year ending May 31, 1883, there were constructed 39.79 miles of the Menominee River Railway, 43.30 miles of the Escanaba and Lake Superior Railway, and 6.71 miles of the Galesville and Mississippi River Railway, making 89.80 miles, all of which has since become a part of the Chicago and Northwestern Railway proper by consolidation and purchase. There were also constructed 78.22 miles of the Toledo and Northwestern Railway in Iowa, and 107.02 miles of the Dakota Central Railway in Dakota, making 185.24 miles of additional proprietary lines. Also 31.50 miles of the Maple River Railroad, the same being an extension of one of the leased lines in Iowa, built by the Maple River Railroad Company.

The aggregate number of miles of road in use at the end of the year was 3,584.10, against 3,278.22 miles at the end of the previous year, an increase of 305.88 miles, or 9.3 per cent.; and the average number of miles operated during the year, 3,464.70, against 3,032.90 during the preceding year, an increase of 431.80, or 14.2 per cent.

The average gross earnings per mile of road operated in 1883 were $6,950.63, against $7,809.24 in 1882; the average expenses and taxes $4,061.69, against $4,167.51; and the average net earnings $2,888.94, against $3,641.73.

The total earnings from passengers in 1883 were $6,119,615.75, against $5,171,423.19 in 1882, an increase of $948,192.56, or 18.33 per cent. Of this gain, $455,347.08 was from first class, $172,550.72 from second class and emigrants, $276,179.79 from excursion, and $44,114.97 from

commutation. The total earnings from freight were $16,894,351.75, against $17,525,134.19 in 1882, a decrease of $630,782.44, or 3.6 per cent. The earnings derived from the transportation of material chargeable to construction of new lines were $230,205.44, or 1.36 per cent. In express and miscellaneous traffic there is a gratifying increase. The mail service shows an apparent decrease of $10,433.75, arising from back pay and balances of the Post Office Department found due on old and new routes, and from deductions affecting the comparative revenue of the two years. The real increase was $46,016.03, while the difference in the above items from the previous year was $56,449.78.

The number of passengers carried in 1883 was 7,968,560, against 6,754,717 in 1882, an increase of 1,213,843, or 17.97 per cent.; the number carried one mile was 248,856,303, against 205,574,178, an increase of 43,282,125, or 21.05 per cent; the average rate per passenger per mile was 2.46 cents, against 2.52 cents, a decrease of 2.38 per cent. This decrease, applied to the whole movement, is equal to $151,563.08 total reduction in fares from the previous year's rates. The average number of miles each passenger was carried was 31.23 against 30.43 in 1882.

The number of tons of freight carried in 1883 was 7,874,665, against 8,190,893 in 1882, a decrease of 316,228, or 3.86 per cent.; the number of tons carried one mile was 1,183,829,358, against 1,192,188,039, a decrease of 8,358,681, or 0.70 per cent.; the earnings per ton per mile were 1.42 cent, against 1.47 cent, a decrease of 3.40 per cent. The decrease in revenue from freight caused by the lower rates was equal to $507,939.81 for the year. The average number of miles each ton was carried was 150.33 against 145.55 in 1882.

At the commencement of the year the company had 558 locomotives, and at its close 578. The number of miles run by engines with passenger trains was 4,913,507; with freight trains, 9,770,415; with gravel trains, 1,267,108; with wood trains, 17,708; switching, 4,063,158—total, 20,031,896, against 18,157,257 in 1882, an increase of 1,874,639. The total cost of service, including repairs, wages of enginemen, firemen and w pers, fuel, oil, waste and tallow was for the year $4,342,896.94, against $3,723,375.60 for the previous year, an increase of $619,521.34; and the cost in cents per mile run 21.68, against 20.51 in 1882. The number of miles run to ton of coal or cord of wood was 28.13; to pint of oil, 7.36; to pound of waste, 112.49.

The car equipment at the close of the year (there having been added during the year 38 first class and 10 second class passenger, 8 baggage and express, 3 mail, 1 officers', 38 caboose, 3 freight, 200 coal and 2 pile-driving cars) consisted of 244 first class and 39 second class passenger, 7 parlor, 6 dining, 107 baggage and express, 21 mail, 5 paymasters', directors', etc., 282 caboose, 18 boarding, 10,143 box freight, 450 gondola, 2,204 platform, 1,435 live stock, 3,857 iron ore, 25 dump, 40 ditching, and 24 pile-driving and wrecking cars—a total of 18,907, after deducting 45 platform and 1 stock car destroyed. The whole number of cars in use at the close of the previous year was 18,650. The total mileage of passenger cars was 22,771,997, against 19,801,642; and of freight cars (loaded and empty) 187,411,933, against 194,547,302.

During the year 18 locomotives, 20 first class passenger, 2 baggage, 100 box freight, 30 live stock, 132 platform, 10 caboose, and 135 ore cars were rebuilt in the company's shops, and the cost charged to operating expenses. The equipment has been fully maintained, and in respect to passenger service has been greatly enlarged and improved. Contracts had also been made for a large number of freight cars, which were to have been added in time for the fall traffic.

The whole sum expended for maintenance, and charged to operating, for materials and labor upon track, bridges, roadway, road-fences, crossings, etc., for the year was $3,952,347.68. Included in the cost of track renewals and repairs are 11,154 tons of steel rails, 39 tons rerolled iron rails, and 36,362 iron and steel rails repaired and relaid; 758,244 cross-ties, 25,038 splice bars, 133,115 angle bars, 380,957 nut locks, 6,421 kegs spikes, 2,695 kegs track bolts, and 111 switches. The expenditure for these items amounted to $1,325,816.13, including $242,227.40 for ballasting track, raising grades, and enlarging and deepening ditches. The number of miles of track on the old and new lines laid with steel at the close of the fiscal year 1882-'83 was 2,783.17, or 77.65 per cent. of the whole. The increase in steel track during the year was 375.45 miles.

During the year $442,538.63 were expended in the construction of 67 miles of additional side track; $86,191.96 for right of way, etc.; $204,523.15 for new structures, such as station buildings, engine houses, stock yards, etc.; $24,809.47 for second main track between Clybourn Place and Evanston; $11,449.47 on West Chicago shops; $4,166.66 for account of Union Elevator at Council Bluffs; $105,759.77 for fences, road crossings, etc.; $227,612.89 for permanent bridges, culverts, etc.; $96,535.28 for grading, ballasting, etc.; and $96,171.39 for engine and car service, engineering, telegraph lines, etc., amounting in the aggregate to $1,299,758.67. There was also expended the further sum of $3,560,295.48 for account of construction as follows: Extension of Menominee River Railroad from Florence, $519,984.75; Escanaba and Lake Superior Railroad, $295,977.89; extension of Aurora Branch Railroad, $95,272.23; Galesville and Mississippi River Railroad, $47,161.01; Mineral extension to Smith mine, $6,369.10; Des Moines and Minneapolis Railroad, $96,756.48; Toledo and Northwestern Railway, $1,035,117.05; Dakota Central Railway, $1,079,939.02; Chicago, Milwaukee and Northwestern Railway, $345,406.04; Consolidation Coal Co. and Western Town Lot Co., $38,211.91. In addition to which $643,722.82 was expended for new engines and cars, making the total sum of $5,503,776.97; from which should be deducted $833,943.86 for premium on bonds and stocks sold, and for sundry construction credits—leaving $4,669,833.11 as the net outlay for construction, equipment and new railroads during the year.

The extension of the Menominee River Railroad from north of Florence was continued during the year to Crystal Falls and the Iron River District, and to various mine openings, in all a distance of 39.79 miles; and the Escanaba and Lake Superior branch and mine extensions were also completed for a distance of 43.30 miles. The consolidation of these roads with the Chicago and Northwestern Railway, which was authorized by the stockholders at their annual meeting in June, 1882, was fully consummated at the adjourned meeting of the stockholders of the respective companies held on the 14th of September following—the common stock of this co npany being issued in exchange for the entire capital stock of the two Michigan companies, amounting to 16,200 shares. By this action

all the proprietary lines in Michigan have become a part of the Chicago and Northwestern Railway.

The Galesville and Mississippi River Railway, which was constructed during the year from Trempealeau station to Galesville, Wis., a distance of 6.71 miles, and the Rock River Railway, extending from Janesville to Afton, 6 miles, both of which were proprietary lines, have been transferred to this company, the consideration being the assumption of their bonds and their nominal liabilities, representing the first cost of the properties. The absorption of these branches was authorized at the annual meeting of the stockholders in June, 1883. No capital stock was issued therefor.

The Elgin and State Line Railway, and the Chicago, Milwaukee and Northwestern Railway, which constituted the remainder of the proprietary lines in Wisconsin, with a small portion thereof extending into Illinois, have also been consolidated with this company, the necessary action having been had at the annual meeting of the stockholders in Chicago on the 7th of June, 1883, at an adjourned meeting on the same day at Milwaukee, and at the special meeting at Menominee, Michigan, on the day following. The amount of common stock of this company issued in exchange for the capital stocks of the two companies is 97,651 shares; but it having been issued subsequent to the writing up of the accounts of the last fiscal year, does not appear as capital stock outstanding in the annexed balance sheet.

The Toledo and Northwestern Railway was completed during the year to a junction with the Des Moines and Minneapolis line, 1.75 miles, and to the Sioux River at Hawarden, 76.45 miles, where it connects with the Southeastern division of the Dakota Central Railway; the latter line extends thence for 125 miles northwesterly through Southeastern Dakota to Iroquois, a station on the main route of the Dakota Central Railway leading to Pierre, on the Missouri River. Through this road connections are formed east and south between the Dakota system and the Iowa lines of the Chicago and Northwestern, and the Chicago, St. Paul, Minneapolis and Omaha Railway Companies.

The extension of the Dakota Central Railway from the terminus of the Winona and St. Peter line at Watertown to Redfield, on the James River line, 71 miles, was completed last fall; an extension of 5.47 miles was also made of the James River Valley line from Ordway to Columbia; and another extension of 30.55 miles was built up the Valley of the Big Sioux River.

The Maple River Railroad extension, 31½ miles, which was built westward from Sac City, Iowa, by the Maple River Railroad Company, is operated under a favorable lease in connection with the older leased line of that company.

About 75 miles of the narrow-gauge portion of the Chicago, Milwaukee and Northwestern Railway, west and south of Montford, to Galena, were changed to standard gauge, and laid with steel rails.

On the 16th of December last, this company assumed control of the Chicago, St. Paul, Minneapolis and Omaha Railway, having previously purchased a majority of the capital stock, both common and preferred, of that company. The purchase consisted of 93,200 shares common, and 53,800 shares preferred stock, the same to be delivered and payment therefor made during the summer of 1883. The cost of this stock, including interest up to the date of delivery, amounted to $10,503,959.90; the payment of the greater portion of which was provided for by the issue and sale of $10,000,000 five per cent. fifty-year debenture bonds of this company, $1,500,000 of which were delivered within the last fiscal year, and are included in the bonded debt as given in the annexed balance sheet. The residue of the bonds have been delivered since the close of the fiscal year. The balance of the purchase money was derived from the sale of a portion of the common stock of this company, issued in consolidation of the two Michigan roads. The stock of the Chicago, St. Paul, Minneapolis and Omaha Railway Company is now held as one of the assets of this company, and three quarterly dividends have been received on the preferred shares since the purchase.

At the time of the purchase, in November, 1882, the system embraced in the Chicago, St. Paul, Minneapolis and Omaha Railway covered 1,147 miles of well equipped road, extending from Minneapolis and St. Paul southeast to a connection with this company's road at Elroy; northwardly to Bayfield and Superior City; southwesterly to Sioux City, Eastern Nebraska, Omaha and the Union Pacific Railway, and by its southern connection at the Iowa State line, opened to the Toledo and Northwestern Railway and all the Iowa roads of this company direct communication for the interchanging transportation of grain, cattle, coal, lumber and other products of Iowa and Minnesota; the company had other extensions and branches, as well as valuable land grants attaching to its Wisconsin lines, whose future development in the lumber interest must afford a large accession of traffic. Under its former management the property of the company had been much improved and enlarged, and some of its lines had become indispensable, and others greatly necessary to the completeness of this company's system in the northwest.

All the business of the Chicago and Northwestern Railway Company between Chicago, St. Paul and Minneapolis flowed through this channel, and, by it connections were secured with the Manitoba, Northern Pacific and Canadian Pacific lines; its northern branches penetrated the best timbered regions of Wisconsin, and reached out to Lake Superior; and its southwestern and southern extensions from Minneapolis gave to the productive wheat regions of the Winona and St. Paul and Dakota Central Railroads easy access, on short hauls, to the unrivaled markets and milling facilities of that city. It is believed that the control of the Chicago, St. Paul, Minneapolis and Omaha Railroad secures advantages of great importance to the stockholders of the two companies, and is in the interest of public convenience, economy and sound corporate policy.

The common stock and scrip of the company at the close of the fiscal year was $16,851,265.97, of which $621,350.32 was owned by the company; and the preferred stock and scrip $22,324,454.56, of which $1,264.56 was owned by the company—the total amount being $39,175,720.53 against $37,328,500.53 at the commencement of the year, an increase of $1,847,220, viz: $1,620,000 issued in consolidation of the Menominee River Railroad Company and the Escanaba and Lake Superior Railway Company of Michigan; $227,000 for conversion of Peninsula Railroad bonds; and $220 in retiring old Galena and Chicago Union Railroad stock.

The total amount of bonds issued during the year was

$5,808,000, and the total amount retired $235,000—leaving the net increase $5,573,000, and making the aggregate bonded debt at the close of the year (including $592,000 live bonds in the sinking fund) $69,821,000, of which $43,874,000 are currency and $25,947,000 gold bonds. The aggregate bonded debt at the close of the previous year was $64,248,000.

From the report of the Land Commissioner, we learn that the total quantity of land in the various land grants on the 31st of May, 1882, was 2,178,281.35 acres; that 286,976.08 acres were deeded, and that 244,109.39 acres and 3,428 town lots were sold during the year, partly on time and partly for cash, for the consideration of $1,205,546.43. The cash receipts of the Land Department, from all sources, land sales, collections on contracts, interest, stumpage, etc., amounted to $1,026,444.10, which is not included in the railroad earnings of the company. The amount of land sold under contracts of future maturity is 387,399½ acres, and the amount remaining in all the grants, inclusive of these sales, on the 31st of May, 1883, was 1,977,736.14 acres.

CONDENSATION OF GENERAL BALANCE SHEETS, MAY 31,

	1882.	1883.
Roads and equipment	$131,419,070 82	$136,088,903 93
Trustees of sinking funds	1,321,000 00	1,525,000 00
Bonds on hand	828.600 00	839,000 00
Cost of securities proprietary companies	37,219 31	2,074,219 31
Outside real estate in Chicago	200,000 00	200,000 00
Materials and fuel on hand	2,291,340 46	2,526,482 48
Due from U. S. Government, express companies, agents and others	1,215,358 47	1,169,053 86
Bills receivable	66,674 16	76,864 73
Cash	1,760,608 02	2,710,496 85
Total	$139,139,871 24	$147,210,021 16
Capital stock—common	$15,095,924 37	$16,229,915 65
Capital stock—preferred	22,153,118 72	22,323,190 00
Capital stock—proprietary roads	22,883,150 00	22,463,400 00
Bonded debt	64,248,000 00	69,821,000 00
Bonds purchased with Winona and St. Peter Railroad Land Grant funds and canceled	366,000 00	460,000 00
Sinking funds paid	1,321,000 00	1,525,000 00
General consolidated gold bonds unsold	407,000 00	284,000 00
Notes of Consolidation Coal Company for coal lands, maturing in 1891	....	300,000 00
Material, fuel, etc., bills for May	1,309,491 03	1,043,022 88
Current pay rolls	831,819 61	922,630 72
Unpresented coupons, old dividends, etc	74,829 85	82,668 49
Accrued interest, not due	675,430 00	675,395 00
Dividends declared, not due	971,184 50	1,023,406 50
Accrued rental of roads in Iowa, not due	439,934 80	530,363 93
Balance due to railroad companies	4,098 47	66,601 48
Notes and mortgages on real estate, etc	404,774 10	.....
Land income accounts	689,534 28	1,033,564 88
Railroad income account, surplus	7,264,581 52	8,425,861 63
Total, as above	$139,139,871 24	$147.210,021 16

President—ALBERT KEEP.

Directors—Augustus Schell, Chauncey M. Depew, Samuel F. Barger, F. W. Vanderbilt, D. O. Mills, Jay Gould, Sidney Dillon, C. J. Osborn, A. G. Dulman, R. P. Flower, John M. Burke, M. L. Sykes, New York; Wm. L. Scott, Erie, Pa.; Albert Keep, Marvin Hughitt, Anson Stager, N. K. Fairbank, Chicago, Ill.

Vice-Pres't, Sec'y and Treasurer—M. L. SYKES.

Ass't Sec'y and Ass't Treasurer—S. O. HOWE.

Second Vice-Pres't and Gen'l Manager—MARVIN HUGHITT.

General Superintendent—J. D. LAYNG.

Purchasing Agent—R. W. HAMER.

General Passenger Agent—W. H. STENNETT.

STEEL nails can be driven into the hardest wood without boring, it is said, going even into white oak knots, without bending. The price of them is about one dollar per keg higher than that of iron nails.

The New Niagara Bridge.

ON the 22d ult. was completed another magnificent achievement in engineering, namely, binding the opposite shores of the Niagara River by the new Michigan Central cantilever, which will be formally opened towards the end of the present month with imposing ceremonies. The structure is light, airy and graceful. Its ends rest on towers built up from the very verge of the rapids, but so light that the spectator finds it hard to realize that this latter graceful structure is strong enough to support the weight of a heavy railroad train. Superintendent Ryland has been the main working spirit of the enterprise, and the fact that the "travelers," by which the construction of the bridge has been so much facilitated, are his invention, shows his efficiency. General George S. Field first conceived the idea of spanning the Niagara with a cantilever bridge, and his plans were accepted. His energy has contributed largely to the success of the experiment. The bridge rests upon solid abutments, built up at the water-line. The top of the stone foundations are fifty feet above the water level, and from these the steel towers supporting the cantilevers rise 130 feet. From the tower foundations up the whole bridge is of steel, every inch of which has been subjected to the most rigid tests, from the time it left the ore to the time it entered the structure. Between the towers is a clear span of 490 feet over the river—the longest double track span in the world. The shore arm of each cantilever having been built and anchored, the others to span the river were constructed in sections of twenty-five feet, the whole being made self-sustaining as each section was added. The ends of the cantilevers reach only 370 feet beyond the towers, which left a gap of 120 feet to be filled. This vacuum has been supplied by an ordinary truss bridge, which has been swung into place, and rests on the ends of the cantilevers. Here provision is made for expansion and contraction by allowing play between the ends of the truss bridge and the cantilevers. At the same time the bridge is thoroughly braced to prevent danger from the lateral pressure of the wind. The total length of the structure is 895 feet. It will have a double track, and will be strong enough to bear two of the heaviest freight trains extending its entire length, and under a side pressure of wind of seventy-five miles per hour, and even then it will be strained to only one-fifth of its whole strength.

THE fifty-second exhibition of the American Institute, New York, was probably the best, so far; certainly the best of recent years. It was largely attended by persons intelligent enough to appreciate its many features of instruction and enjoyment. The machinery department contained many exhibits of interest.

CARTON-PIERRE.—This material is a compound of paper pulp and plaster of Paris. It is said to be very tough, strong, plastic, and light, and practically fire-proof. A contemporary recommends its use in paneling cars; and states that there was a factory in Philadelphia, some few years ago, which made pillars, moldings, etc., of *carton-pierre*, in addition to its regular business of making dolls' heads of the same material.

NARROWNESS of mind is often the cause of obstinacy; we do not easily believe beyond what we see.

Communications.

Editor American Railroad Journal:

One frequently hears, now-a-days, of the superiority of passenger car floor-framing over the former style, to resist the force of collisions and smash-ups in general. As is well known, the present style of floor-framing is the use of intermediate sills running lengthwise of the car, while the old style consisted of cross timbers, running crosswise of the car. It is claimed that the latter plan allows of a colliding engine entering like a wedge between the two outside sills, as the cross timbers afford no resistance, breaking like matches, and that the modern plan, as it presents the ends of the intermediate sills to the shock, will prevent the engine from entering the body of the car to a greater extent than the old plan. In practice, however, these claims are not substantiated, as a recent accident on the C. B. and Q. R. R. has amply demonstrated. It appears that a passenger train slowed up to pick up a flagman who had been sent out to hold it, and was run into from the back end by a freight engine and train following. The freight engine crushed its way into the last car of the passenger train its entire length, the front flue-sheet of the freight engine being broken in, probably by the ends of the intermediate sills, which thus proved a source of further calamity, as the broken flue-sheet allowed the steam and water to escape in large volumes into the car, suffocating and scalding those who might have escaped the mere collision. It looks probable that if the breaking of the flue-sheet was due to the intermediate sills, the old plan of cross-framing would have prevented this feature of the accident.

It is, of course, impossible to so frame a car that a colliding engine cannot crush its way into it, and to attempt this is useless; while it is equally plain that if the old plan is less liable to knock holes in the boiler than the new, the former is superior, so far as this goes. Accidents of this character will occur as long as railroads exist, and an inquiry into the extent or influence of the floor-framing in increasing the horrors of a collision would seem to be in order.

OLD-TIME CAR BUILDER.

Editor American Railroad Journal:

The value of a comparfson between the performance and cost of maintenance of locomotives on different lines of roads is fully appreciated by those interested in the matter, but the entire worthlessness of such comparisons as at present made, does not appear to be generally understood, or the cost of printing performance sheets, for the purpose of exchanging and comparing with similar sheets of other roads, would not be incurred by so many roads, in the management of which the severest economy is exercised. A dry-goods merchant in New York City would not value the information a pin's worth that it was costing him twice or half as much to sell a dollar's worth of goods, as a similar merchant located in Syracuse, N. Y. Outside of the mere fact that they are both merchants and both engaged in selling dry goods, there is no similarity between their business, and a comparison would be the height of foolishness, because the difference in the line of goods, the rent, freight, facilities for handling goods, competition, and a thousand and one other conditions and things make their business entirely dissimilar. And still many railroad companies are year in and year out comparing facts as uncomparable and dissimilar as the case supposed. To illustrate the matter more clearly, two roads are each month exchanging performance sheets. One road runs along a lake shore for many miles, is perfectly level, is exposed to powerful side winds from the lake, they build no new engines and haul many oil tank cars with a truck in which the oil boxes are bolted to a wooden beam, and which cars haul as heavy as two ordinary box cars with diamond truck. This road also hauls two foreign cars to one of its own, and uses nothing but the ordinary eight-wheel engine

The other road runs through an inland portion of the country, and is sheltered by the timber on each side of its line of road, has heavy grades, builds its own engines in the old fashioned style of "cut and try," hauls its own cars to a larger extent than foreign cars, and uses Mogul engines largely. The former road's performance sheet shows a cost of sixteen cents per mile while the latter occasionally runs as high as 20 cents.

It is evident that the details entering into the make-up of these two performance sheets are so entirely different that a comparison is impossible, and to say which road's locomotive is run the cheapest is equally impossible. The reasons for this are plain from the above, but to make it still clearer the following facts may assist. On some roads the number of cars making a train is decided by the engineer, who frequently, if desired to haul thirty cars, will refuse to take more than twenty-five, because his engine steams badly, or the coal is poor, or he has ten flues plugged, or the rail is bad, or any of the too-numerous reasons the average engineer has at his tongue's end. In such cases, the engineer desiring to make a good record on fuel and repairs, and knowing that the extra cars will count against these items, refuses to injure his record, which, if bad, gets for him a reprimand from the master-mechanic. On other roads, where the transportation and mechanical departments are on the best of terms, the number of cars is designated by the former department and the trains are as large as the engines can haul. The engineer may complain and bring his excuses forward, but they avail him nothing, as he is informed that *there* is his train and if he can't take it, he may take his engine to the round-house. He knows the significance of this, and manages to get over the road with the train. The former road shows a small expense per mile run by its engineers, because the engineer determines the most favorable conditions—that is a light train, which allows of his working the reverse lever back to twelve or fourteen inches and using the steam expansively, while the latter road loads its ingines so heavily that the reverse lever is seldom back of twenty inches, and the cost of fuel per mile is greatly augmented. The layman would naturally suppose the master-mechanic of the former road to be the better man, on examining the performance sheets of the two roads, whereas, unless he fully understands the most minute particulars of both roads, he would be doing the master-mechanic of the latter road great injustice. Another source of great uncertainty in looking for information for comparison between the locomotive departments of two roads, as shown by the performance sheets, is the great variation of mileage allowed for construction train engines,

switching engines, hill engines, etc. One road allows sixty miles per day for a construction train engine, another road 100 miles. One road will credit its freight engines with ten miles per hour for the time they are waiting at stations, and for all delays. Other roads allow nothing. Some roads give their switching engines six miles per hour, others eight, ten and twelve. Their different rates are frequently stated on the sheets, and if they were, when so stated, the actual allowances, a better comparison could be made, but in the writer's knowledge, several engine dispatchers credit their switching engines with *ten* miles per hour, when it is stated on the performance sheet that but *six* miles per hour are allowed. Every fictitious mile thus gained helps out the showing. To illustrate this:—the writer has seen sheets of roads where the mileage per ton of coal for the twenty odd switching engines ran from forty to fifty miles, while the sheets of another road in the same locality, using the same coal, etc., showed from ninety to 130 miles per ton of coal. This does not mean (although it is intended it should) that the latter road has better engines, or that they are in better condition, or handled more skillfully; but it does mean that the latter road allows more than twice the mileage per hour. It will be seen that the latter road, by a little skillful juggling, gains about 3,000 miles per month, which proportionally decreases the *printed* cost per mile run. Another very influential item in making up the showing of performance sheets, is the head to which the cost of building a new engine to take the place and number of a condemned engine is charged. If charged to "equipment," the performance sheet is benefited by from $8,000 to $12,000; if charged to "repairs," this amount swells the general average of "cost per mile run," and as how such items are taken care of is not stated on performance sheets, the entire worthlessness, as a source of comparison, of such sheets is apparent.

It has been proposed to reduce the performance of engines and trains to "mile-tons" of work done by means of a dynamometer attached to a train of known weight, and hauled over the entire length of the road. Thus would be taken into account all curves, grades, etc., in making up the average resistance per ton per mile, and this once established would determine by simple multiplication the gross work of any number of tons handled in a given time. With such a system in use, and a universality of treatment of all the other items, a fair comparison might be made. But the increase of clerical work involved in such a system will probably prevent its coming into use. SINBAD.

TO PREVENT RUSTING OF IRON.—Thousands of dollars are lost each year by the rusting of plows, hoes, shovels, etc. Some of this might be prevented by the application of lard and resin, it is said, to all steel or iron implements. Take three times as much lard as resin, and melt them together. This can be applied with a brush or cloth to all surfaces in danger of rusting, and they can easily be kept bright. If tools are to be laid by for the winter, give them a coating of this, and you will be well repaid. It can be kept for a long time, and should always be on hand and ready for use.—*Building*.

THEY who dig the deepest, build the safest.

Our English Letter.

WRITTEN SPECIALLY FOR THE AMERICAN RAILROAD JOURNAL.

SINCE I wrote you last, the half-yearly meeting of the Eastern Extension, Australasia and China Telegraph has been held in London, under the presidency of Mr. John Pender, M. P. The following passage from the report shows the financial position of the concern:—"The gross receipts, including Government subsidies, have amounted during the half year to £213,729, against £207,119 for the corresponding period of 1882. The working and other expenses (including £22,759 for cost of repairs and laying of new cables and expenses of ships) absorb £62,779 against £50,356 for the corresponding half year of 1882, leaving a balance of £150,951. From this is deducted £2,000 for income tax, and £41,595 for interest on debentures and contributions to sinking funds, leaving £107,356 as net profit for the half year, against £113,393 for the corresponding period of 1882." Of the chairman of the meeting I need say but little, because he is well-known in both hemispheres as a man of business who handles capably very gigantic interests. Perhaps those of your readers who have known his as a prominent name during many years, and observe his doings with the greater interest since he was a visitor to the United States, are not aware of the fact that he is of an exceedingly humble extraction—one of numerous self-made men of whom we as well as you can boast. The writer has been informed that he began life as a common carpenter. All honor, I say, to the man of brains and energy who emerges from obscurity into world-wide fame.

Judging from a recent speech made by Mr. Chamberlain, our Radical cabinet minister, Mr. Plimsoll's humane impulses have still abundant cause for provocation. The wonderful development of the British marine is at the expense of many lives. In his great speech at the recent Trinity House banquet, Mr. Chamberlain said: "The loss of life at sea is continual, and is increasing out of proportion to the trade by which it is accompanied. Last year 1,303 British ships went to the bottom, representing a loss of 378,000 tons. The year before 1,310 ships were lost, representing a tonnage of 348,000 tons, and that is the largest loss of ships at sea that has ever been recorded in the registers of the State. In last year alone in British ships, 3,372 lives were lost, and that also is the largest death rate on our registers, excepting one year, 1874, when two colonial ships went down with 1,200 coolies, who perished on board." I may be running off the track a little to observe that Mr. Chamberlain, whether he knows it or not, is the coming statesman of the United Kingdom. He is the head and front of the democratic movement which is leavening the whole lump of British politics.

M. de Lesseps has been feasted and flattered to his heart's content while on a visit to this country. British interests need better facilities in the use of the Suez Canal, and probably in the addition of a second channel of communication between the Mediterranean and the Red Sea. Both objects are well served in the impressionable vanity of the clever Frenchman who made the canal, and your shrewd Britisher has found this out. Speaking of M. de Lesseps, who, your readers may not know, is of Scottish extraction, I am reminded that he aired his eloquence to some purpose while in England during his short stay in the early part of November. Even Ameri-

can oratory would be tasked to produce anything better said than the following: "Commerce and navigation require that isthmuses, which were barriers to them, shall become free straits, that vast barren depressions accessible to the sea shall form new shores and ports, and that lines of railway shall continue to extend their network all round the earth. Thus, I say, free straits, inland seas, commercial ports and railways are the real roads of peace and civilization."

Mr. J. K. Cross spoke hopefully at the close of the late session of Parliament, of the present and future development of the railway system of Hindostan. It seems that although thirty years have elapsed since the first railway was constructed in that vast country, only ten thousand miles were open for traffic in March, 1883, but steps have been taken under the energetic administration of the Earl of Ripon, to largely increase this number within a few years.

Middlesborough, as probably your readers know, is the centre of the Cleveland iron district. It is a large town which has grown up like a mushroom. Not much longer than a generation ago it had no being, and now is the center of a vast industry and considerable commerce. To promote this, the Northeastern Railway Company are about to begin the carrying out of a comprehensive scheme for the extension of the docks, at an estimated cost of over two hundred thousand pounds. The present docks are reached by means of an artificial channel branching off from the river. This channel is to be considerably deepened, and widened from eighty to 230 feet; the entrances of the docks are to be greatly improved, the docks themselves are to be enlarged very appreciably, ample provision will be made for the access of the largest class of vessels at all states of the tide, and upon the quays will be an extensive supply of hydraulic machinery for the rapid loading and unloading of cargoes. Middlesborough, I may add, up to quite recently had very inadequate public buildings, both as to size and appearance. Mr. Gladstone, who is a grave and reverend seignior but little given to jocularity, on a visit made to that murky town some twenty years ago, made a joke at the expense of said buildings, which still clings to the local recollection. Speaking of the tiny town hall, he said it reminded him of a growing boy whose legs had gone too far through his trousers. Middlesborough's importance, by the way—no joke intended—is augmented by the new railway, known as the Whitby, Redcar and Middlesborough.

An action has been tried in the City of London Court which has an amusing as well as a practical side to it. The plaintiff was a Mr. J. Tolley, Jr., of 66 Cannon street, London, who sued the Southeastern Railway Company to recover the sum of one guinea for damage done to a hat whilst traveling on the defendants' line. The plaintiff stated that on the twenty-fifth of August he was a passenger on the line, and on arriving at London-bridge station he rose to get out of the carriage. In doing so his hat, a new white one, came into contact with the lamp. The outside was very greasy, and consequently made a mark on the top of the hat which could not be removed. The hat being thus rendered useless, the proceedings were taken. The solicitor for the company said the plaintiff should have exercised more care, and could not recover for his own negligence. His Honor: Are you bound by statute to carry lamps? The Solicitor: Yes, I think we are. His Honor: Then you must make your carriages higher. I must find for the plaintiff, with costs.

Among several noticeable railway inventions patented quite lately, should be particularly mentioned the sleeping berths invented by R. Hutton, of Disley, and R. A. Gartside, of Manchester. These are suspended by means of india rubber or other springs or chains. Presumably a comfortable arrangement, which suggests that I leave your readers to their repose.

H. A. L.

THE Mann boudoir cars, the first of which came out of the Troy shops at the end of November, are to be particularly offered to traveling theatrical companies. Colonel Mann, the inventor or promoter, is said to be a Georgian who went to Europe and worked up a sleeping car system and offered it to Mr. Pullman, who preferred to take his own system thither. Sixty-three European railroads have adopted this system. The two cars now ready are completely of American manufacture; the embossed or leather work, which resembles bronze, is made in New York; the prevailing tint of the car lining, of amaranth wood from India, is a subtle dark red. The exterior of the car is a dark blue, and over the windows are designs in stained glass. A passage-way runs along the side of the car from end to end, and at one end is a space for ladies traveling alone, shut off by a door across the corridor. At the other end are a buffet, small smoking-room and *commodes*. Several staterooms of different sizes, some connected, make, by day, English compartments with a baggage netting, a table that turns into a ladder, electric bell, and berths, either two or four in number, across, not lengthwise of the car, each berth single and none of double width; these berths become two seats by day. Ventilation is secured by collecting the air in a funnel and passing it through ice, shavings and water to take out the soot and dust, and then letting it in at the corridor floor to go out through the state-room top. By the Mann system more privacy is secured at the expense of room, vivacity, and light. The parlor cars we already possess contain the corridor within the saloon, and the night cars, by the lengthwise arrangement of berths, also contain it. The Pullman and the Mann car each accommodate twenty-four passengers.

PROF. BURT G. WILDER, of Cornell University, says that a student should never sleep less than eight hours, nor study directly after meals. The Professor should advance this idea cautiously. He may find his students eating half a dozen meals a day.

A STEEL pen, like a race-horse, should have good usage, bearing equally on each nib and the penholder pointing to the shoulder. With an occasional rest, in conjunction with every instrument made of steel, an Esterbrook Pen will accomplish wonders.

IT always makes a man open his eyes on a Western train, when he tells a fellow-traveler what a splendid plate of raw oysters he had in the hotel car, to be informed that the oysters were removed from their shells about a year ago, and that they are taken from hermetically sealed cans, when ordered, and placed in shells carried on the train for that purpose.—*Puck.*

Tramway.

[*The English nomenclature of "Tramway" is adopted in this department as being of greater convenience and more specific in its meaning than "street railway," though in alluding to individual organizations we shall preserve their corporate titles. It is our hope to nationalize the term Tramway, which is now generally used in every English-speaking territory with the exceptions of the United States.*]

American Street Railway Association.

President.—William H. Hazzard, Brooklyn, N. Y.
First Vice-President.—James K. Lake, Chicago, Ill.
Second Vice-President.—George B. Kerper, Cincinnati, O.
Third Vice-President.—D. F. Longstreet, Providence, R. I.
Secretary and Treasurer.—William J. Richardson, Brooklyn, N. Y.
Office of the Association, cor. Atlantic and Third Avenues, Brooklyn, N.Y.

TO OUR READERS.

THE Tramway department of this magazine is now a year old, and a review of what has been accomplished therein during the past twelve months, is gratifying and encouraging. It was undertaken with the purpose to develop a new feature of journalism, and received in its beginning that substantial appreciation, expressed by leading men in the street railway interest, which has continued and increased to the present time. The stage of experiment has long been passed, and we shall begin the second year of what only twelve months ago was a novel expression of journalistic enterprise, with the confidence which results from the practical proof that we began it at the right time, in the proper spirit, and by the employment of the true means to success in the undertaking. To readers who have kept track of what we have periodically presented relative to street railways, from the time when the new departure was made, we need not say that information has been new, timely and full, and that every one of the minor interests involved in one of immense magnitude, has been impartially represented. This has been illustrated in a remarkable manner, by the prominence given to the subject of the cable as a motor. Moreover, the evidence of what we have ventured to claim, has been given, in the most satisfactory and convincing manner, in the form of opinions and various practical suggestions, stated by persons most competent to give them, either in the shape of communications written above the signatures of their authors, or, with the ready courtesy for which we submit our acknowledgments, in response to the questions of interviewers detailed from this office. These pleasing reminiscences are submitted as patent facts and without vanity, but, we are free to acknowledge, with the consciousness that we are deserving of such credit as is attached to diligence and the disposition to be strictly impartial in what we print; and with the cordial recognition of the very substantial aid given our venture by well-informed and practical street-railroad men of both the United States and Canada.

In making these observations, which seem to us opportune at the close of the first year of the Tramway department, we desire to add that our arrangements for 1884 justify the promise that it will be found better and stronger during that time, than it has been in the first twelve months of a period of encouraging development. In this assurance we respectfully invite the coöperation of all who can, in any way, promote our intention to expand, as far as it can be expanded, the street railroad department of this journal.

CONTRIBUTIONS treating the varied subjects coming under street railroad matters, are always welcome; such as descriptions and suggestions on road-beds, observations on the heating of cars, the choice and care of horses, motive power, the relation of companies and their employés, the constructing and ornamentation of cars, etc., etc. In short, the Tramway Department is open to the discussion of all matters coming within the scope of its comprehensive signification.

OUR valued contributor, Mr. Aug. W. Wright writes us that certain typographical errors appeared in his communication printed in the October issue. In correction of these he observes: "I said: 'A motor must therefore be proportioned to take its maximum load at *all times* and under the most *unfavorable* (not *favorable*) circumstances.' Again: 'The usual allowance for this friction upon a straight and level (not *loose*) track of T rail,' etc., etc. Again. 'The above brief statement, Mr. Editor, is my reason for asserting the *superior* (not *inferior*) advantages of horse power up to this time,' etc., etc."

MAYOR EDSON, of this city, has appointed commissioners under the act passed on June 18, 1875, commonly known as the Rapid Transit Act, for the purpose of laying out a route or routes for railway companies to construct and operate traction street surface railways in this city.

The appointment was made on a petition presented by James Gamble, general manager of the National Cable Railway Company. It is reported that the commission will meet and organize as soon as possible, and receive propositions for the establishment of new routes to be operated under the cable system. The officers of the National Cable Railway Company are: William P. Shinn, president; Constant A. Andrews, vice-president; J. C. Lewis, secretary; Thomas W. Evans, treasurer; James Gamble, general manager; General Egbert L. Viele, consulting engineer; William Dorsheimer and Robert Sewell, general counsel. The company is the owner of all the Hallidie and other patents which are used in the street railway system in San Francisco and Chicago.

THE new cable road from San Francisco to Ocean Beach was opened December 1. It is over seven miles long, yet the the trip is made in half an hour and the fare is only ten cents. Messrs. Stanford and Crocker are the chief owners, and are said to have made the road the best equipped cable line in the country.

The Cable Tramway in San Francisco.

THE following communication will be read with the greatest interest. We believe it to be the most complete and most useful article on its subject, which has yet appeared.

SAN FRANCISCO, November 9, 1883.

Editor American Railroad Journal:

One of the first questions asked by the general public, when seeing for the first time the narrow slot between the track of the cable tramway, is, How do you keep the dirt out of the tube? it must soon fill up unless you keep many men at work to clean it out. The answer is simple—the dirt doesn't get in to any extent, and in the roads in San Francisco the tubes only require cleaning out three or four times a year, and even then the amount is so small that it does not exceed three cubic yards to a mile of tube. This, which at first was a question of much importance, has ceased to be of any moment; and, as in this city during some three or four months of the summer, and at short intervals for two or three months more during the spring and autumn, we have strong winds without any rain, large quantities of dust and sand are moved in the streets, and I suppose we are more liable to experience trouble from dirt in the tube than any other city. With the experience we have had here we do not consider the question of dirt in the tube at all, or at least of any importance, as affecting the running of the carrier sheaves under the endless cable. In that respect our experience may be of advantage to other cities desiring to build cable tramways.

So far as water is concerned, in low or long level sections of the road connections are made to the sewers, and, as the slot of the tube at the surface is slightly higher than the rails, the water during a heavy storm runs off to the side gutters of the street instead of dropping much into the slot.

As the first two tramways operated by cable in San Francisco were much in the nature of experiments, the tubes (which are a large factor in the cost of construction of a cable tramway) were made largely of wood, that the expense might be confined within moderate limits, but, with the termination of all experiments, and the success of the cable, both mechanically and financially, more care and expense were devoted to the construction of the tube and permanent way, and the latest built road, that of the Market Street Cable Railway Company, has been constructed with a lavish expenditure of money, with the desire to have the best and most permanent method of construction that could be devised. The metallic portion of the structure consists of railway bars bent to such a shape that the center forms a portion of a circle of the shape of the bottom of the tube, while the ends are carried up and outward to the under side of the rails, to which they are connected by a wrought iron chair riveted to the rail, and having a slot into which the flange of the rail is set, and projecting ears from the chair are turned over cold on to the flange, thus securing the rail permanently. Suitable brackets project upward from near the bottom of the rail, and also inward horizontally from the chair, which support angle irons, that serve to form the seat from the surface of the street to the interior of the tube. The frames or skeletons for the latter are placed along the street every three feet, and the rails and angle iron fastened to them; then moulds to form the inside of the tube are put in place, and outside and around is placed concrete, forming a monolithic structure the whole length of the road, and as enduring as the metal of the rails and slot irons. This has been considered, for this particular purpose and the locality where the road is built, to be the best adapted, and is, undoubtedly, warranted by the decreased cost of operating expenses and the increased capacity for traffic. The cost of construction of this road—or rather conversion, as it has been heretofore operated by horses—is, probably, much greater than any road of the kind, and as the owners of the road control the railway system of California, and have had much experience, it may be presumed that they would not add double the original cost of construction to a tramway were they not reasonably satisfied of a fair return for the investment. I believe that the increase of travel requires an increase of about 25 per cent. in the number of cars, although each car has an increased capacity of about 40 per cent over the old cars operated by horses, in seating capacity and more rapid transit.

In San Francisco the tramways which pass the hills have to encounter heavy grades, and the first question, almost, was a grip that would hold the rope without slipping, the wear of the rope being, although an item of considerable expense, deemed not of the vital importance of the sustaining power of the grip. This may be appreciated when it is known that the grade over which some of the cable tramways run has a grade of one in $5\frac{3}{10}$, or nearly 1,000 feet to the mile. After the practicability of a grip for this work was demonstrated, came the desirability of saving, as far as possible, the rope from wear by the friction through the grip, and this has been reduced primarily by guiding rollers arranged so that when a car is stopped for the taking up or putting down of passengers, the dies or jaws (which hold the rope when the car is being propelled) are withdrawn from the rope so as not to touch it, yet, at the same time, the guiding rollers allow the rope to pass along without much friction or wear; secondly, by the care in connecting the grip to the rope when starting a car, which is a matter of practice with the grip man or the one who has charge of the grip. It was first thought necessary to have the grip constructed so that the shock of the rope in starting a car would be partially absorbed by springs, with a long range of extension or compression; experience demonstrated that the rope itself, if kept to the proper tension, and supported at proper intervals, and the grip closed upon it with the instinctive care which short practice by an intelligent man ordinarily yields, provides all the spring that is necessary, and so now in the latest mode of construction the spring in connection with the grip is dispensed with. Some of the grips used on the roads in this city do not have any guide rollers for supporting the rope when moving loosely through the grip; others, when the grip is made to open on the side, so that the grip has to move laterally to get into and out of the grip, have two guiding rollers under the rope, and when the rope is released from the die or jaw by moving the jaw vertically downwards, the rope, by its weight, lies in the two guiding rolls. Another form of grip, and the earliest, has the dies to open by moving laterally, and this has four guiding rolls, inclined toward each other and pressed against the rope by a spring having a limited

amount of compression, so as to keep the rolls in contact with the rope when the jaws are withdrawn from gripping the rope. In this arrangement of grip the rope can be picked up at any part of the road by opening the jaws wide by an auxiliary screw, and when lowering the whole grip and frame down over the rope the closing the jaws sufficiently so that the guiding rollers will carry the rope; then raising the grip and frame again until its proper height is reached, so that it will not strike the carrier sheaves in passing over them, and then it is all in condition for starting the car or train. When the grip is so constructed that the rope enters the side (or "side-grip," as it is called to distinguish it from the grip where the rope enters vertically into it from the bottom, and which is called a "bottom grip"), in order to put the rope into the grip, the track is usually covered slightly side wise, and the rope is also raised up for a short distance by carrier sheaves at that particular point, or the road-bed or track is sunk down so that the opening into the grip and the rope will be at the same height, and the car and grip passing this point the track is curved back again to its normal direction.

The friction of the grip on the rope in taking hold naturally causes wear, and in time the wires in the lay of the rope on the circumference show the abrasion, and in case of some of the ropes have shown much apparent crystallization. So far as the working strength of a rope is concerned none are really worn out, but through the continued movement and changes of direction around sheaves, and the chafing in passing the grips, the lay of the rope becomes slack, and where the rope has been spliced the ends gradually work out, and, finally, project sufficiently to be caught by the grip, and this strand is pushed back, forming a coil around the rest of the rope, and then this has to be taken out and a new strand put in, or, perhaps if a rope has been worn some time, the whole splice has to be cut out and a new piece put in. The ropes are discarded from service long before their breaking strength is reduced to anywhere near the load to which they may be subject in ordinary wear or work. The life of a rope is as long as the surface of the rope can be kept smooth, and as it passes along it has the appearance and touch of a round bar of iron. The life of a rope varies, or the lives of different ropes on the same road are different. Nearly if not all of the known flexible steel, and some iron ropes, have been tried on the roads in this city, and none has equaled in durability the crucible steel iron rope manufactured here.

On one of the roads here, one rope gave a running life of over twenty-two months, while the next rope had the short life of not much more than one-quarter of that, but the short lived rope was of an entirely different kind from the other, and was tried for the purpose of demonstrating the values of different kinds of rope. The power required to propel the rope, with the necessary driving machinery, including all the sheaves along the road for supporting the rope, and large sheaves for changing the direction of the rope, will not exceed for properly arranged and constructed driving-gear, one-horse power indicated for each five thousand pounds of rope moving at a velocity of one mile per hour, and this proportion is perhaps diminished as the speed is increased up to ten miles per hour. The power for hauling cars is about fifteen pounds per ton at a speed of six miles per hour. The cost of fuel for the passengers carried varies considerably, as the amount of coal consumption, for the fuel capacity of a tramway is not much more than when only one-half its capacity is taxed. On one road here, 13,000 passengers have been carried with 3,700 pounds of Sydney coal, and on another road 16,000 passengers have been carried with 4,200 pounds of Cardiff coal, while with one-half this number of passengers carried on either road, the decreased consumption of coal was scarcely noticeable. We find much difference in comfort and convenience between roads that have engines that run steadily and those that do not; or in other words, regularity of speed in an engine driving cable tramways is an important element in their operation. I do not know of any work performed where the variations of work are so great, with a demand for such regularity as in our roads in San Francisco, owing to the grades to be overcome. A train consisting of dummy and car, with passengers weighing, say ten tons, and taking a strain on the cable of 150 pounds to haul it on a level, requires a strain of 2,150 pounds to haul it up a grade of 1 in 10, and some of our grades are much steeper than this, or 1 in $5\frac{3}{10}$ to 1 in $6\frac{1}{10}$.

Unless the speed of the rope is maintained at a uniform rate when these changes of grade take place, the tension of the rope being increased, causes a variation of speed in the cars all along the line, and this to some causes sickness, especially among ladies. The effect is noticed in the complaints of the public, who avoid, when possible, those lines where the speed of the engine is not uniform under great variations of work suddenly imposed upon it. The work is, from such causes as above alluded to, increased as much as three times the average work of the engine, and demanding for economy, an engine that can furnish an extended range of cut-off in the valve gear. Of the various engines that I have indicated here on the cable tramways, none have approached the Porter-Allen engines for regularity of speed, although they had not the desired range of cut-off for best economy. For driving the rope, or rather for giving the necessary traction to the rope which passes over the driving drums, different devices are used on different roads, one using a clip pulley or drum having hinged clips arranged around its circumference, and which compresses the rope as the strain comes on it and releases the rope as it leaves the drum.

Another arrangement is similar to that used on the Mahancy inclined plane, in Pennsylvania, having two large sheaves arranged one before the other, and the rope passing partly around both and thence around an idler sheave placed on a traveling carriage so that any slack in the rope from stretching may be taken up, and thence to and along the street. Another arrangement is the two drums similar to those on Bishop's derrick, and such as is used for driving the rope over the Brooklyn bridge. Each is adapted for particular local conditions, and former experience of the constructing engineer will determine for a road to be constructed which is best adapted for the work required, and locality where the machinery may be placed. As the engine of the day has high piston speed, and the speed of traveling cables is comparatively slow, intermediate gearing becomes a matter of some importance. If the engine house is located in a densely populated district, or a neighborhood where much noise from running machinery is a nuisance, gearing should be made of such kind as will give the least offence.

Some of the roads here use double-gear, and others use single gear and slower piston speed, and one uses round cotton belting with grooved pulleys, while another uses a single wide leather belt from the engine-shaft pulley to the large pulley over the driving-drum shaft. Each one of these systems of driving-drums and gearing has its advocates. When single gearing is used between the engine and driving-drum, of course slower piston speed and larger cylinders ensue.

The study and construction of cable tramways is destined to become of great importance in the transit of people about cities, and the advantages of this system of propulsion of tramways will, in the near future, cause it to take the place generally of all others as being the most economical in operating, the most rapid, prompt, reliable, and comfortable to the passenger.

W. W. HANSCOM.

Painting Street Cars.

BY AN OLD PAINTER.

II.

THE ornamentation of a car, both exteriorly and interiorly, forms no little part of the painter's labor, and for that reason I think a second chapter on street car painting will not be amiss. There has been of late a seeming desire to ape the styles of the æsthetic house decorator, and to bedaub—if that's the word—the sides, ends and interiors of street cars with their Eastlake, Queen Anne, Japanese or some other such *stuff*. The style known as "Eastlake" was first brought out by Mr. Charles E. Eastlake, of England, and fully described by him in a published work entitled "Hints on Household Tastes." It is simply a "style," not a classified "order," with defined principles of treatment and rules of application and delineation. It is so unrestrained in its requirements that the wildest conceits of the uneducated pretender may be imposed, and the most absurd and distorted features defended as in "keeping with the style."

Delineated with taste and judgment in the sphere for which it was designed—*i. e.* house decoration—it may be made pleasing to the eye; but the excessive display indulged in by a class of reckless adventurers who abuse the integrity of this new idea by unsightly, extravagant and ill conceived creations of their own, is calculated to render it offensive and repulsive to those enjoying a fair degree of refinement in the æsthetics of ornamentation; this may in time cause its rejection even as a "style," except by those who prefer oddities, or, who being devoid of skill in execution, wish to palm off monstrosities as real works of art.

The school-boy will often produce upon his slate a more meritorious design than many we see on what ought to be good work, and it should be the aim of the true ornamenter to discountenance this innovation upon his trade, as it takes from him the value of all his years of practice, and brings his handiwork down to a scale at par with the dauber.

The eye of a tired traveler does not wish to rest upon distorted arabesques; he needs cheering by pleasant reminiscences, or by a peep at nature formed by art. The student who takes nature for his model—and he can get none better—cares not to waste time in studying out a Japanese puzzle, unless it be that he is infected with the la-de-da wild fever. The mechanic can catch no idea to enable him to gracefully form a pattern for some machine from the figures placed before his eyes, as he journeys homeward with mind all-absorbed in his daily avocation. He seeks for form in nature, and it may be, that while wandering in the park, a beautifully twisted leaf or stem, will convey the idea of a graceful stand for a lathe or other machine; and so he ignores the ornamentation placed before him, to find what the street car painter has missed, in the park among flowers and birds, leaves, stems and boughs as nature made them, not as a diminutive brain would choose to have them.

It may be a matter of dollars and cents with a railway company, who insist upon the "style" spoken of, for if they do their own painting, they can engage second-rate workmen to do such work at second-rate wages; and they can pass him off as an A 1 workman to those who don't know better.

These several styles, nearly all one thing, are well enough in their place upon the walls, dado, frieze or ceiling of a building, but, as said in my previous chapter when speaking of lettering, such work is entirely unfit for street car ornamentation, an assertion made by one who has been a painter for over thirty years in coach, wagon and car shops. I want to emphasize the idea that nature furnishes the best patterns for ornamenting. The scroll used by the Persians over 2,000 years ago was formed with flowers and leaves. The Acanthus plant was the proto-



FIG. 1.

type of the Greek scroll, the most beautiful one perhaps, for it still finds favor in the eyes of those who love nature. The artist who paints a landscape, succeeds in proportion to the exactness of his imitation of nature, and since the ornamenter's field is fundamentally the same as that of the former, the ornamenter ought to look for his copies to the same source, making such exceptions as the practical necessities of the case demand, and no more. If we become familiar with anything, we are enabled to grasp with greater ease the significance of similar things, and it is therefore important that we choose those subjects for ornament which are familiar; and what is more familiar than the forms of inanimate nature—leaves, flowers, etc.? The study of the designer should be to save the observer as much study as possible, and if he be able to make his work appear as if it grew in its place by a natural process,

he will have achieved all the honors of a true artist, and not till then.

If, as before hinted at, dollars and cents were the rocks on which true ornamentation split, I will endeavor to instruct those who are at present unacquainted with the plan, in a cheap, yet artistic style of ornamenting, namely: by DOUBLE STENCILING. The plain or single stencil plate is no doubt well known, and needs no comment other than that it ever has a cheap, "stencily" appearance, unless a vast amount of labor is expended in cutting out the bars with a pencil after the stencil has been "put on;" but with the double stencil there is no great amount of labor, and to all appearance it may be said to be hand work, and not, as I have heard it remarked, "The work was done by making a hole in a piece of paper and then rubbing it over with a brush."

TO MAKE A STENCIL, first procure some pasteboard, known as printer's press packing, a thin, hard and strong material, of a bright russet or leather color; a piece of



FIG. 2.

thick glass to cut upon, a sharp knife and a stone to sharpen it, and a pencil for drawing the design. These being at hand, it will be best to make the design on thin paper (ordinary white or manilla paper) so that the pasteboard need not be doubled; fold it once, and allowing the fold to form the center of the pattern, draw upon one side whatever taste may dictate as one-half the design, always keeping in mind that the parts which would drop out by cutting must be held in place by "bars" or connections with the main portion of the paper. When the drawing is completed, lay the paper (double as it is) upon the glass, and with a sharp knife cut out the parts marked, leaving holes in the paper so that when it is unfolded or laid out flat, the whole design will appear as a single stencil plate.

Now, having the ground-work thus prepared, lay the stencil upon a sheet of pasteboard, (as spoken of above) and, holding it firmly in place, pass over it with a stencil brush lightly, or just sufficient to mark an outline of the design, then mark with a pencil those parts which may be *cut out to cover the bars* as shown in Fig. 1, leaving the other parts untouched. Lay the pasteboard on the glass and cut out as before, thus forming, as we might say, one-half the pattern. To all double or triple stencil plates there must be a key, that is, some means by which one pattern may be laid over the other to secure correct "register;" and in the accompanying engravings the key is shown in the two dots at the intersection of the upper part of the figure. These dots are cut in each stencil, as shown. When the first half of the design is completed, lay it upon another pasteboard, having the faintly marked outline as before, as correctly as possible, then stencil brush it over so that the color is quite solid or prominent. Lay the second pasteboard on the glass and cut out all that is not solidly covered, making the "bars" to fall upon those places as shown in Fig. 2. Of course the key-holes will be cut in this stencil the same as before, then when No. 1 is painted, put the key-holes over the spots in No. 2, paint that, and a perfect design will be formed as shown in Fig. 3. Stencils made in this manner may be put on in two colors, but as a rule but one color is used, or gold leaf and bronze.

Such stencils should be neatly numbered and placed upon a hook on the wall, or laid carefully away in a book.

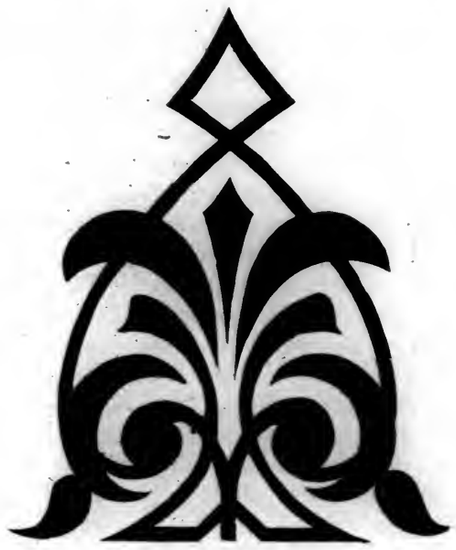


FIG. 3.

It is an excellent plan where much stenciling is done, to make a scrap-book of the patterns, that is, to paint them on to the leaves of a quire of manilla paper, and then if one is accidentally lost or destroyed, there will be a chance to cut a new one with but little trouble.

Stencil designs may be purchased from dealers in painters' materials, and it will, we think, be an easy matter to make them as we have shown when once the design is in hand. Pouncing is simply the application of whiting or other fine, dry powder through pin-holes made in paper, forming the outline of any object. The lettering on cars may thus be made uniform and the "laying out" be quickly done where many are to be finished alike.

Although there are a few who still cling to the absurdities in ornamentation, known as Japanese, Egyptian, Eastlake, and a dozen other such titles, we find that in the interior decoration of street cars, as done in New York for lines in other places, that something more than schoolboy sketching is desired. Here we see a window panel of white holly or other light wood, neatly centered with a landscape whose sky blends off to the wood, or in other words, "is lost in the distance." Here is another with a beautiful bunch of violets, another with ferns and green leafing "true to nature," but of all, though these are pleas-

ing to the eye of the weary traveler, and serve to divert his thoughts from care and toil, there is one style of ornamentation, which, to our eyes, oversteps anything we have yet seen. It was introduced by Mr. F. B. Gardner, the well-known writer on painting, and is described by him as follows:

The idea originated from spatter work as done by many of the fair sex, but this is more artistic, they simply leaving a bare spot, after the leaf or other object has been spattered over.

Mr. G. says: Procure a number of fern, oak, maple, and other nicely shaped leaves of many sizes; a bottle of Higgins' drawing ink (India ink); a tooth brush and a paper of small pins.

Now, having a white holly panel nicely smoothed off, lay on the leaves to form a pleasing bouquet, or whatever fancy dictates, and fasten them securely by pinning them to the wood. Next, pour some of the ink into a saucer; with the forefinger of the right hand moisten the ends of the bristles in the brush, then holding the brush directly over the panel and leaves in an upright position, gently press over the bristles with a little stick to bend them, so that in flying back they will send a fine spray of ink upon the panel. Repeat this operation, if need be, twenty times or more until the central part is quite dark and the outer edges blend off to nothing. Now lift one of the leaves and lightly spatter that part next to its mate, again another, and so on until all the leaves are removed, giving at the same time a light shade of spattering to the one side of each leaf, as in painting. When all is done, add a few veins with a fine pencil filled with the ink. It requires some practice to do the work nicely, but it gives a beautiful effect. Other forms, such as a cross or monument, may be added to the cluster of leaves, and these make a pleasing contrast. When all is done as described, let dry, then lightly go over the panel with a camel's hair brush filled with French shellac varnish, and finish as usual. For car panels, this class of ornamentation is not only new but beautiful.

Choosing either of these methods of ornamenting—the latter for interiors only—there is no reason why something better than school-boy designs should not be found upon street cars, and when railway corporations or supers have opened their eyes to the fact that the requirements for a car are different from those for a dwelling, church or theatre, and that a majority of their patrons are not æsthetic, in the Oscar Wilde sense of the term, the millennium will have been reached.

A COMPANY has been organized to construct and operate a cable line railway between Hailey, Idaho, the northern terminus of the Wood river branch of the Oregon Short Line, and Ketchum, 10½ miles distant. The track is to be three feet gauge, and the pulleys carrying the cable will all be above the track. The machinery is to be operated by water; the plant to be located on Wood river, about half way between Hailey and Ketchum. At that point a measurement of the water a few days ago showed 28 inches depth by 35 feet in width, with a speed of 65 feet per minute. The speed of the wire will be such as to take a car between the two termini in one hour.—*Railway Age.*

A MAN'S wisdom is his best friend.—*Sir W. Temple.*

List of Recent Patents for Inventions Relating to Tramways.

287,826. TRACE-HOLDING ATTACHMENT FOR HAME-CLIPS: Geo. W. Hall, Nora Springs, Iowa. Filed June 22, 1883.

287,833. HORSE-SHOE: George B Howie, Chicago, Ill. Filed June 14, 1883.

287,885. SCREEN FOR PROTECTING THE EYES OF HORSES: Joshua Sumner, Colorado Springs, Colo. Filed Aug. 21, 1883.

288,016. CAR-STARTER: Henry Clark, Milwaukee, Wis., assignor of two-thirds to Frank W. Erbacher and Christian Helms, Jr., both of same place. Filed Sept. 10, 1883.

288,141. HORSE-COLLAR PAD: Johannes Wallmer, Middlebury, Ind. Filed Aug. 22, 1883.

288,143. AUTOMATIC FEED-GEAR FOR ANIMALS: Elijah J. B. Whitaker, New York, N. Y. Filed Aug. 29, 1883.

288,180. GRIP FOR CABLE RAILWAYS: Almerin H. Lighthall, San Francisco, Cal. Filed Feb. 3, 1883. Renewed Oct. 9, 1883.

BEARING DATE NOVEMBER 13, 1883.

288,211. MOISTURE AND PRESSURE PAD FOR HORSES' FEET: Leander A. Couilliard, Boston, Mass. Filed May 28, 1883.

288,220. QUARTER-BOOT FOR HORSES: Joseph Fennell, Cynthiana, Ky. Filed July 11, 1881.

288,562. HORSE-COLLAR THROAT: Edward D. Fisher, Wooster, Ohio, assignor of one-half to George B. Miller, same place, Filed Aug. 27, 1883.

288,578. ADVERTISING DEVICE FOR CARS: Ernest Kitz, Indianapolis, Ind., assignor of one-half to Jacob W. Loeper, same place. Filed Feb. 14, 1883.

288,595. HALTER: Henry Rorebeck, Parma, assignor to Charles E. Coates, Spencerport, N. Y. Filed May 18, 1883.

BEARING DATE NOVEMBER 20, 1883.

288,614. HARNESS ATTACHMENT: Frank M. Boring, Jamestown, Ohio. Filed Sept. 20, 1883.

288,615. TRAVELING SIGN FOR STREET-CARS: Thomas H. Bowles, Atlanta, Ga. Filed Dec. 6, 1882.

288,636. TOE-WEIGHT: Charles B. Hitchcock, Indianapolis, Ind. Filed April 21, 1883.

288,646. ROPE-RAILWAY: Joel B. Low, San Francisco, Cal. Filed Dec. 17, 1881.

288,690. CABLE-GRIP: Benjamin F. Carman, San Francisco, Cal. Filed Sept. 11, 1883.

288,696. HARNESS CHECK-HOOK: Alfred C. Dietz, San Francisco, Cal. Filed July 3, 1883.

288,815. METHOD OF OPERATING CARS ON CABLE RAILROADS: John Jochum, Brooklyn, N. Y. Filed Oct. 8, 1883.

288,825. PAVING-TOOL: Philip S. Maloney, Philadelphia, Pa. Filed March 20, 1883.

288,836. HORSE-BOOT: Joel Miller, Philadelphia, Pa. Filed Sept. 3, 1883.

288,839. HAY-CARRIER: Richd. Miller, Appleton, Wis., assignor of one-half to John G. Kanouse, same place. Filed April 5, 1883.

288,880. OVERSHOE FOR HORSES: James W. Smith, Jersey City, N. J. Filed May 23, 1883.

288,947. CABLE SWITCH OR SHIFTER FOR UNDERGROUND ENDLESS-CABLE RAILROADS: Almerin H. Lighthall, San Francisco, Cal. Filed Oct. 13, 1883.

288,948. TAKE-UP MECHANISM FOR ENDLESS-CABLE RAILROADS: Almerin H. Lighthall, San Francisco, Cal. Filed Oct. 13, 1883.

BEARING DATE NOVEMBER 27, 1883.

289,129. FEED-BAG ATTACHMENT: John H. Palmer, New York, N. Y. Filed July 28, 1883.

289,139. CABLE-RAILWAY CAR: Charles W. Rasmusen, Chicago, Ill. Filed Feb. 13, 1883.

289,177. DETACHABLE HORSESHOE: Joseph Thomas and Byron Betzer, Kingston, Ohio. Filed April 25, 1883.

289,214. FEEDING DEVICE FOR HORSES: Theodore L. Brooks, Port Byron, N. Y. Filed Oct. 10, 1883.

289,341. FARE-COLLECTOR FOR PASSENGER-CARS: Benjamin G. Fitzhugh, Frederick, Md. Filed May 14, 1883.

289,355. RAIL FOR STREET-CAR TRACKS: Arthur J. Moxham, Louisville, Ky., assignor to the Johnson Steel Street Rail Company, same place. Filed July 25, 1883.

THE truly valiant dare everything, but doing anybody an injury.—*Sir P. Sidney.*

A Retrospective View.

"THERE be three things which make a nation great and prosperous—a fertile soil, busy work-shops, and easy conveyance of men and things from one place to another." Thus wrote Bacon in 1617, while as yet railroads were unknown; even long before the day when the contract was made for "a rapid line of coaches" between Edinburgh and Glasgow, a distance of 44 miles. The journey was to be made in three days, the round trip taking six days. If he had lived in our day, when railroads have made it possible to traverse the distance in less than a half-hour, would he not have said:—the prosperous nation is that nation whose railroad system is the most perfect.

The origin of the railroad is, by some writers believed to be unknown. There is in the British museum an Egyptian hieroglyphic which represents slaves drawing stones over a road like a primitive tramway. One writer would have us believe that a similar device was known in China many years ago. Whilst it is admitted that printing, gunpowder and many other things, were familiar to the Chinese before they were known to western civilization, yet it is highly improbable that anything approaching a tramway, nearer than a palanquin, was known.

The earliest authentic mention of a railway occurs in the life of the Lord-keeper, Roger North, early in the 17th century. About 1670 a double parallel line of wooden beams was laid at Newcastle-on-Tyne, and large carts with four rollers, drawn by horses, were used to transport coal from the mine to the river. A flange placed at the side of the beam kept the carts from rolling off the rail. So successful was the experiment that other coal districts in England and Scotland followed the example. It was a great labor-saving scheme, for a horse that could with difficulty draw only 17 cwt. without the aid of this smooth road, could now, with ease, draw 42 cwt. This was the earliest tramway, the precursor of the steam railway.

The first improvement made on this tramway was the laying of iron plates on the wooden beams; this contrivance reduced the friction and made less wear and tear.

In the year 1768, and not, as some writers claim in 1740, rails made wholly of iron were used, and almost entirely superseded the earlier style; and in 1789, when William Yessop built the first public railway in England, at Loughborough, he introduced the edge rail of cast iron, and changed the flange from the rail to the wheel. The rails continued to be made of cast iron, in lengths of about four or five feet, until 1803, when an experiment was made with malleable iron, with poor success, but upon a second trial in 1808, at Cumberland, they proved satisfactory.

During this time while so much was being done for the roadway, it must not be supposed that no changes were being made in the rolling-stock; small trains of two or three cars were now sometimes run, and vast improvements had been made in carriages. Up to this time the tramway had used horses for motors, and in some instances stationary engines, but men's minds had been constantly exercised to invent some method of drawing cars by means other than cable or animal power.

Richard Trevithick and Andrew Vivian, two Cornwall engineers, took out the first patent ever issued for a locomotive in the year 1802. In the previous year, however, Oliver Evans, of Philadelphia, moved a steam dredging machine a distance of one and one-half miles on its own wheels, with power furnished by itself. Evans had been ridiculed by scientific men, and when he advocated the steam carriage, they called it "Evans' steam mania," yet, notwithstanding the opposition, he had successfully built at the cost of $3,700, a steam engine with a six inch cylinder and eighteen inch stroke. As far back as 1759 Dr. Robinson, of the Glasgow University, suggested to Watt the practicability of applying steam to wheel carriages, and in 1782 Murdock, the tutor of Trevithick, made a model of a steam carriage; and considering this circumstance, it may be possible that Trevithick got his idea from Murdock. Watt, in his patent of 1784, describes a steam machine for drawing cars. All these steam carriages and appliances, however, amounted to almost nothing, so far as the public was concerned. It was not until 1804 that any really practicable locomotive was used. Trevithick in this year built a second locomotive which he used on the Merthyr-Tydvil Railway in South Wales. This engine drew a load of ten tons of iron ore five miles per hour.

From this date, 1804, until 1811, very little, if anything, was done to advance railroads; time and ingenuity were employed to invent some means to keep cars from slipping when going up an inclined plane.

Many and many were the appliances employed to get the locomotive to "bite." Elaborate systems of cog wheels, cars with hind legs, like grappling irons, all made for an entirely imaginary difficulty, for in 1811, on the Wylam railway, it was demonstrated that weight and friction were all that was necessary to draw loads up gentle inclined planes.

The first really successful engine was invented by George Stephenson in 1814. It ran six miles an hour, drawing thirty tons. Until 1829 there was little progress made, then Robert Stephenson built the "Rocket," which attained a maximum speed of twenty-nine and one-half miles an hour, with an average of 15 miles. In the United States the subject of railroads was carefully considered when the Erie Canal subject was broached. Stevens advocated a railroad instead of a canal, but his idea was considered visionary. The first road built in America was in 1826, at Quincy, Mass., from the granite quarries to the Neponset River, a single track about three miles long, and an inclined plane of about 275 feet. This road was used for the transportation of granite only; the rails being like the earlier iron-plated tramway roads. During this year, 1826, charters were granted to the Columbia, Lancaster and Philadelphia Railway Co., and the Danville and Pottsville Railway Co., the former on April 7, and the latter on April 8. In January 1827, the Mauch Chunk road was begun, and in three months its nine miles was finished. The Mohawk and Hudson River Railroad also received its charter this year to run between Albany and Schnectady. February, 1828, saw the Baltimore and Ohio road chartered to carry passengers between Baltimore and Elkridge, and in 1830 it was opened for travel—the first passenger road in America. It was only fifteen miles long, and the power used was horses. In the Summer of 1831 the Mohawk and Hudson opened for travel, they also using horse power, which they soon changed to steam power, using the first Stephenson locomotive imported into this country, the

"Robert Fulton." It must not be supposed that the "Robert Fulton" was the first locomotive in America, for W. Howard, of Baltimore, in 1828, took out the first patent for a locomotive engine, and this same year Horatio Allen, engineer of the Carbondale and Honesdale R. R., took the first locomotive trip upon a road in America. The experimental trip was made across the Lackawaxen on a trestle-work thirty feet high, with a curve of 400 feet radius. So dangerous was the undertaking considered that upon his return unharmed, he was welcomed as one snatched from the jaws of death.

What a mighty change is this. In 1826 there was in the United States three miles of railroad; in 1880, 86,497. In 1763 the stage coach between Edinburgh and London took two weeks to accomplish its journey; in 1835 the distance was 48 hours; in 1849 the time was reduced to 12 hours.

A grade of 30 or 40 feet to the mile was considered very heavy, and 70 or 80 feet was reckoned impossible. A grade as steep as this was overcome by the use of a stationary engine. To-day, engines are in use that can ascend grades of 500 feet and more. The Mt. Savage, George's Creek road in Maryland, has an ascent of 140 feet, and at Sheffield, England, a road has a grade of 196 feet.

In the light of our experience, how foolish the protest of Wood sounds, who wrote in 1825, "Nothing can do more harm to the adoption of railroads than the promulgation of such nonsense as that we shall see locomotive engines traveling at the rate of 12, 16, 18 and 20 miles per hour."

Railroading, advanced as it is, is far from perfect. We can learn many things from across the ocean Many things to adopt and many things to eschew. Let us learn to have cars like the twin palace cars on the North Western Railway, and do as they do, charge nothing extra for their use. Let us never develope such an elastic conscience as the French road which charges 45 francs ($9.00) for sleeping accommodation, their coupé de lit for *one night*. Let us learn something of speed from England's three fast mail trains, the "Wild Irishman," from London to Holyhead, where the mail is transferred to fast steamers, which make without difficulty twenty miles an hour, and at Kingstown is again put aboard the train and goes to Dublin; the "Mad Scotchman," from London to Edinburgh, which makes forty-seven miles per hour including the stoppages; and the "Flying Dutchman," a very significant name when we consider that the rate of speed is fifty-nine miles one furlong per hour. Surely the old Dutch captain never at his best doubled the Horn at this rate.

There is one thing the English can certainly learn from us, and that is how to check baggage. If there is one mighty abomination of English railway travel it is the system (if system it can be called), of handling luggage. Formerly the baggage was carried on top of carriages, so as to give the rain and soot unobstructed play upon it: but the tears and groans of tourists, over ruined goods, caused in time a reform, and now the baggage is placed in a compartment in the car. Upon arrival at the depot your baggage is given in charge of an official, who pastes upon it a ticket with your destination. Upon arrival at destination your goods are put on the platform, and going up you indicate which is yours, and it is delivered without a question. There is absolutely no protection; any stranger can get your luggage as readily as you can yourself.

Before closing, I want to mention a matter which seems to always attract the attention of tourists. Everywhere on the continent the freight cars are marked by the military powers, with the numbers which the car will hold either in horses or men, thus, thirty-six men, six horses, etc. In case of emergency the general of an army can tell at once his facilities for transportation.

E. L. B.

Lubricating and Lubricants.

BY E. F. DIETERICHS, CLEVELAND, O.

ALL the jointed parts—the valves, the slides, steps, journals and gearings of any kind of machinery—driven by steam, water or other power, require lubricating while in motion, to relieve the friction, lest overheating take place, injuring the machinery and causing loss of power used to produce the motion. To lubricate economically and efficiently is the aim of every thinking mechanic, and it requires not only understanding of machinery, but knowledge also of the theories of lubricating, and the nature and quality of the means adapted for that purpose.

I.

WHAT IS LUBRICATING.

Many engineers, machinists, manufacturers and oil men are holding to the theory that lubricating is simply interposing a substance of some kind or another, as a sort of cushion between the metallic surfaces of machinery in motion, and some even are advocating the use of softer metallic compounds and the finer grades of inert matter, such as plumbago, sulphur, lime, asbestos, soapstone, etc., for that purpose. Now, if this theory is correct, there should be no need for the use of fatty matter for lubricating, or certainly a very limited amount of lubricant should be sufficient for an indefinite length of time to prevent the retarding of motion, the heating and abrading, and subsequent injury to the machinery. We find, however, that this is not sufficient, and that we have to furnish a regular supply of lubricant in exact proportion to the frictional heat evolved by the velocity and the amount of work we expect to be done by our machinery. Friction is created wherever the surface of one part of machinery in motion is bearing on the surface of another, and friction creates heat. The heat is evolved in ratio with the velocity, and by continued motion, however slow, it finally accumulates to such an extent that the machinery has to be stopped to allow the metal to cool, or in other words, the heat absorbed to be given off into space.

Metal is able to absorb a large amount of frictional heat, but it is unable to free itself of it as fast as it is created under continued and rapid motion, and finally accumulates it to such an extent as to become overheated and softened, and if the motion is still continued will actually weld itself together.

To avoid such heating, and enable us to run machinery continuously, we have to apply other than metallic lubricants, and are obliged to apply them continuously, and as long as the machinery is kept in motion.

When we apply oil as lubricant on a particular part of machinery in motion, we find that in the course of time a considerable amount of it has been consumed. Where

has it gone? what has become of it? Even if we allow one-half of it as having been wasted carelessly, or as belonging to the gummy deposits wiped off from time to time, we have still to ask: What has become of the balance? This balance has been vaporized by the frictional heat evolved by the motion and carried with it into space, and we have to replace it over and over again by renewed applications, thus showing that the cushion theory is erroneous. What, then, is lubricating? The facts before mentioned show us that lubricating is the withdrawal and disposal of frictional heat from substances in motion against each other, to prevent their abrasion, economize power, and facilitate motion. We do this by presenting to the moving surfaces those of another substance better qualified to absorb the frictional heat, and better able to vaporize and radiate with it into space.

The parts in motion absorb the frictional heat, and if not allowed to rest, continue to absorb and accumulate it until they would finally reach their vaporizing temperature. We therefore interpose substances which can vaporize at a temperature far below that of the substance of which the moving parts are constructed, and which are thereby enabled to absorb the heat and carry it away, before the parts can accumulate enough of it to cause their expansion, softening and abrading, and subsequent interfering with their motion.

When the frictional heat increases to the vaporizing temperature of the substance, the atoms radiate into space with the absorbed heat, and the individuality of the substance becomes changed. Solid substances vaporize at higher temperatures than fluids, and by interposing the latter between the surfaces of the less volatile substance, the frictional heat is drawn therefrom.

Of all substances at our service for such purpose, water is probably the lowest lubricant; it will keep moving parts cool if we can apply it properly,and fast and lavishly enough, but its vaporizing point is so low that, for want of body, its absorbing and storing property allows only a limited transfer of frictional heat into space. We have therefore to look for substances that possess sufficient body and proportionate vaporizing quality, and this we find in fatty matter—animal, vegetable and mineral.

When we interpose fatty matter between moving surfaces, their viscosity permits their adhering to the latter, and at their vaporizing point they radiate with the absorbed heat into space; they vaporize at much higher temperature than water, and at a so much lower one than metal that the latter is prevented from absorbing more than a proportionate temperature as long as we continue to apply the lubricant. The characteristics of fatty matter differ, and their value for lubricating depends on their heat-absorbing quality, and a thereto proportionate vaporizing point.

(*To be continued.*)

THERE is a strong tendency among us to dodge all the practical, vital questions which press close around and upon us, and give ourselves in an indolent spirit to dreaming about the distant and unimportant.—*Dio Lewis.*

THE keel of a large propeller for the Cornell Steamboat Company is being laid by the Harlan & Hollingsworth Company. Her dimensions will be: Length, 240 feet; beam, 34 feet; depth of hold, 15 feet.

LITERARY NOTES.

JOHN L. STODDARD, whose eminent position in literature, we need not say, is assured, is the author of "Red-Letter Days Abroad," a captivating and elegant work. In its first portion the reader is taken through Spain, scarcely, if ever, more interesting in its chequered history than at the present time. Well written descriptions of Toledo, Cordova, Seville, the Alhambra, Granada and Gibraltar are accompanied with wood engravings of original design, and remarkable excellence. Mr. Stoddard next portrays the performance of the Passion Play at Ober Ammergau in 1880, which drew together about two hundred thousand men and women, through motives of mixed curiosity and piety—the former largely prevailing. His account of the play, his portraits of the leading characters who participated in it, his pictures of scenes from the play, and his descriptions of the peculiar surroundings, all are replete with great interest. The volume concludes with a description of the two leading "cities of the Czar"—St. Petersburg and Moscow. The same distinguishing characteristics mark these as the preceding papers. The narrative is smooth, and at the same time vigorous. "Red-Letter Days Abroad" is an appropriate gift book for the approaching season, its merits are so varied and striking, and its beauty so apparent. Boston: James R. Osgood & Company.

FISH AND FISHING.—The publishers of *The American Angler*, now in its fourth volume, announce that the illustrated series of essays on The Game Fishes of America, which have been issued each week by them during the year 1883, will be continued into 1884. These essays on angling are exhaustive, embracing over seventy-five engravings drawn from nature, of the representative fish of American waters, with copious letter press, giving the habits and habitat; popular and scientific description, coloration, etc., of each fish; also, the tackle used and *when*, *where* and *how* to capture them. These articles are written by the best angling writers in America and form a complete text book for anglers, a want not filled by any other existing publication. The twenty pages of *The American Angler* are issued weekly, and in addition to these valuable essays, contain sterling illustrated contributions and editorial articles on fish, fishing and fish culture; notes and queries as to the habits and modes of capture of game fish; reports of fishing (in season) from all parts of the country, etc., etc. It is the fisherman's paper—the only one on the continent. The publication offices are at 252 Broadway, New York, and the subscription price is three dollars a year.

A MAN on the cars having several thousand dollars in greenbacks in his possession, and fearing to go to sleep sitting in his seat, on account of seeing some suspicious individuals in his neighborhood, slyly slipped his money into the Bible belonging to the train, and on the following morning woke up to find his capital gone, and to learn that the men who slept with their cash in their pockets hadn't lost a cent. This fable teaches us that while it is a good thing to be just sharp enough, it is very dangerous to be too smart, and that when the smart man gets left, he is the most colossally left man that ever was left.—*Puck.*

THE secret of success is not so much in catching on as in holding on after you catch on.

New Inventions.

IMPORTANT TO INVENTORS.

THIS department of the AMERICAN RAILROAD JOURNAL is devoted to descriptions of the many and interesting New Inventions applicable to railroads, and in order to make it as complete as possible, inventors whose improvements properly come under this description, are invited to send us a detailed account of the same. This should consist of facts only, presented in clear and concise language, written only on one side of the paper, and the sheets numbered consecutively. In all cases in which it is desirable and practicable, the written description should be accompanied by a cut or cuts illustrating the invention. This or these should be marked distinctly on the bottom, with the name and address of the sender. All cuts received are preserved at this office, or returned, if desired, to the person sending them to us for use. As we have an engraving department we are prepared to make cuts, and furnish estimates of our charges for the same to those persons who write us for such particulars. That we may estimate exactly and without delay, it is necessary that we have sent to us, a photograph of the Model and a copy of the Specifications.

The reader of course understands that the editors reserve their inalienable rights to decide what "copy" they shall use, what changes shall be made in it, if any, and when they shall use it; but they guarantee the impartial consideration of every description sent them.

Descriptive articles relating to Tramways will be placed in that department.

List of Patents for Inventions Relating to Railways.

BEARING DATE NOVEMBER 6, 1883.

287,796. NUT-LOCK: William V. R. Blighton, Tonawanda, N. Y. Filed April 9, 1883.

287,806. SCREW OR NUT FASTENING FOR RAILWAY-BAR JOINTS: Benjamin Franklin Crocker, Hyannis, Mass. Filed Sept. 19, 1883.

287,810. RAILWAY-SWITCH: Wilson P. Dodson, Philadelphia, Pa. Filed Jan. 25, 1883.

287,849. CAR-COUPLING: Christian Niekrenz, Farina, Ill. Filed July 2, 1883.

287,860. CAR-COUPLING: John V. Reams and Archibald C. Majors, Burlington, Kans. Filed Dec. 6, 1882.

287,888. CAR-WHEEL: Theodore Thurber, Auburn, N. Y. Filed March 24, 1883.

287,889. CAR-BRAKE: Dolphus Torrey, New York, N. Y. Filed Oct. 23, 1882.

287,920. SWITCH-BLOCK FOR RAILWAYS: John Fonda, Battle Creek, Mich. Filed Jan. 23, 1883.

287,934. CAR-COUPLING: Elijah M. Hobbs, Santa Rosa, Cal. Filed March 6, 1883.

287,936. CAR-TRUCK: Orrin S. Holt, Chippewa Falls, Wis. Filed April 10, 1883.

287,952. MECHANISM FOR LAYING RAILROAD-TRACKS: Albert Michelson, Chicago, Ill. Filed Nov. 1, 1882.

287,961. AUTOMATIC RAILROAD-SIGNAL: Christian M. Raffensparger, Hanover, Pa., assignor of one-half to G. Milton Bair, same place. Filed Feb. 12, 1883.

287,966. DRAW-BAR FOR CARS: Halbert Rust, Jeffersonville, Ind. Filed March 16, 1883.

287,973. RAILWAY FOOT-GUARD: Frank W. Spencer, Flint, Mich. Filed June 16, 1883.

287,999. RAILWAY-CAR SEAT: Stephen Shaw Black, Fredericton, New Brunswick, Canada. Filed Jan. 16, 1883.

288,058. TAIL-LIGHT BRACKET FOR RAILROAD-TRAINS: Jas. D. Hollister, Savannah, Ga. Filed July 9, 1883.

288,074. CAR-COUPLING: Adolf Lehmann, New York, N. Y. Filed Sept. 7, 1883.

288,083. CAR-COUPLING: Alexander B. Mahon, Pensacola, Fla. Filed April 10, 1883.

288,103. DUMPING-PLATFORM: William F. Nine and Alber R. Case, Sully, Iowa. Filed Aug. 14, 1883.

288,105. CAR-COUPLING: Aaron Park, Ottumwa, Iowa, assignor to himself and Theodore P. Baker, same place. Filed Aug. 21, 1883.

288,112. RAILWAY-STATION INDICATOR: Parker Price, Sandy Run, Pa. Filed Sept. 8, 1883.

288,162. STATION-INDICATOR: William C. Collyer, Lynn, Mass., assignor of one-fourth to Charles A. Chase, same place. Filed Feb. 26, 1883.

288,190. CAR-DOOR: John L. Wagner and James Seath, Terre Haute, assignors to themselves, Thompkins A. Lewes, Indianapolis, Robert S. Cox, Terre Haute, Ind., and Henry R. Duvall, New York, N. Y. Filed June 15, 1883.

288,195. SPARK-ARRESTER: Howard M. Smith, St. Louis, Mo. Filed April 7, 1883.

BEARING DATE NOVEMBER 13, 1883.

288,209. COUPLING ATTACHMENT FOR LOCOMOTIVE TENDERS: George H. Colby, Boston, Mass. Filed June 14, 1883.

288,242. SIGNAL FOR LOCOMOTIVE HEAD-LIGHTS: J. Miller Kelly, Rochester, N. Y. Filed April 23, 1883.

288,258. CAR-COUPLING: La Fayette W. Page and D. Page, Shreveport, La. Filed June 8, 1883.

288,260. REFRIGERATING STRUCTURE: William S. Post, Boston, Mass., assignor to the Post Refrigerator Car Company, Portland, Me. Filed April 7, 1883.

288,270. CAR-COUPLING: Jas. W. Snyder, Emporium, Pa. Filed Aug. 21, 1883.

288,298. AUTOMATIC CAR-BRAKE: August J. Berg, Chicago, Ill. Filed Oct. 28, 1882.

288,335. STOCK-CAR: Henry Clinton Hicks, Minneapolis, Minn. Filed Aug. 16, 1883.

288,348. RAILWAY SIGNAL APPARATUS: Fred Lane, Boston, Mass. Filed Sept. 8, 1883.

288,356. DEVICE FOR MAGNETIZING THE TIRES OF DRIVE-WHEELS OF LOCOMOTIVES: Eusebius J. Molera, San Francisco, Cal., assignor to John C. Cebrian, same place. Filed Feb. 6, 1883.

288,361. SLEEPING-CAR: William H. Paige, Springfield, Mass., assignor of one-half to Daniel D. Warren, same place. Filed Oct. 30, 1882. Renewed Sept. 24, 1883.

288,378. JOINT FOR RAILWAY-RAILS: William J. Stevens, New York, N. Y. Filed Aug. 26, 1882.

288,379. STATION-INDICATOR: Samuel Stewart, Newark, N. J. Filed July 28, 1883.

288,388. CONNECTION FOR RAILWAY-BRAKES: Geo. Westinghouse, Jr., Pittsburgh, Pa. Filed Sept. 14, 1883.

288,398. CAR-BRAKE: Henry Barratt, York, Pa., assignor of one-half to Jacob O. Miller, same place. Filed Sept. 1, 1883.

288,461. AUTOMATIC CAR-BRAKE: David J. Macpherson, Sioux Falls, Dak., assignor of one-half to J. B. Young, same place. Filed Aug. 6, 1883.

288,469. CAR-WHEEL: Phineas E. Merrihew, Fairhaven, Mass. Filed Jan. 25, 1883.

288,470. DRAW-BRIDGE ALARM: Ernest F. Meyer, Lake Charles, La., assignor to Herman H. Schindler, same place. Filed May 22, 1883.

288,480. ELECTRICAL TRAIN-STOPPING AND SIGNAL APPARATUS FOR LAND-SLIDES: William P. Phelps, Philadelphia, Pa., assignor to the Railroad Safety Lock and Signal Company, of New Jersey. Filed July 21, 1882.

288,488. SPARK-ARRESTER: John Choice Printup, Rome, Ga. Filed Aug. 3, 1883.

288,494. RAILWAY-CAR GATE: William W. Rosenfield, New York, N. Y., assignor to Joseph Aron, same place. Filed April 3, 1883.

288,502. CAR-COUPLING: John W. Sheaffer, Franklin, York County, Pa. Filed April 2, 1883.

288,504. CAR-COUPLING: Victor Shreve, Detroit, Mich., assignor of one-half to Bolivar Meeker, same place. Filed Aug. 30, 1883.

288,507. RAILWAY-VELOCIPEDE: Geo. N. Spencer, Three Rivers, Mich., assignor of one-half to Hiram Gaskins, same place. Filed April 20, 1883.

288,513. ELECTRIC RAILWAY AND LOCOMOTIVE: William M. Thomas, Cincinnati, Ohio, assignor of one-half to Samuel W. Skinner, same place. Filed Nov. 6, 1882.

288,518. STATION-INDICATOR: William H. Waddell, Charlottesville, Va. Filed April 13, 1883.

288,519. RAILWAY TIME-SIGNAL: William H. Waddell, Charlottesville, Va. Filed April 13, 1883.

288,527. CAR-COUPLING: Johnson S. Waugh, Prospect, Ohio, assignor of one-half to K. E. Randall and L. Gast, same place. Filed June 23, 1883.

288,565. FREIGHT-CAR DOOR: Henry N. Frentress, East Dubuque, Ill., assignor of two-thirds to Charles W. Ware, same place. Filed June 9, 1883.

288,568. AUTOMATIC STOP FOR DRAW-BAR BRAKES: Wm. B. Guernsey, Norwich, N. Y., assignor to Jane M. Guernsey, same place. Filed June 22, 1882.

288,569. AUTOMATIC CAR-BRAKE: Wm. B. Guernsey, Norwich, N. Y., assignor to Jane M. Guernsey, same place. Filed June 23, 1882.

288,577. SWITCH-OPERATOR: James H. Kennedy, Iona Station, and Thomas P. Hall, Toronto, Ontario, Canada. Filed Feb. 26, 1883. Patented in Canada April 12, 1883, No. 16,651.

288,580. RAILROAD-GATE: Saml. B. Langford, Homer, La. Filed June 26, 1883.

288,594. PASSENGER-TICKET: John M. Reynolds, Oswego, N. Y., assignor to James H. Mandeville, Trustee, Washington, D. C. Filed June 21, 1883.

288,599. GRATE-BAR FOR LOCOMOTIVES: Isaac W. Swallow, Kingston, Pa. Filed Aug. 22, 1883.

288,600. CAR-COUPLING: Augustus T. Teall, Jr., Rochester, N. Y., assignor of one-third to William Manning and Charles E. Manning, both of same place. Filed April 30, 1883.

BEARING DATE NOVEMBER 20, 1883.

288,644. STATION-INDICATOR: George M. Lane, Asbury Park, N. J. Filed Dec. 23, 1882.

288,652. RAILWAY-FROG: William J. Morden, Chicago, Ill. Filed April 10, 1882.

288,656. COMBINED CHAIR AND FISH-PLATE FOR RAILROAD-JOINTS: Hiram B. Nickerson, New Bedford, Mass. Filed March 29, 1883.

288,678. CAR-STARTER AND BRAKE: Washington G. Stitt, Jabez Lowbridge, and Adam Rosenkranz, Allegheny, Pa., assignor of one-half to Peter Walter, Jr., same place. Filed Aug. 10, 1883.

288,680. STOCK-CAR: Stephen P. Tallman, Dunellen, N. J. Filed Aug. 23, 1883.

288,683. STOCK-CAR: Marion H. Walker, Whitehall, Ill. Filed Aug. 1, 1883.

288,704. RAILWAY-RAIL JOINT: Thos. H. Gibbon, Albany, N. Y., assignor of one-half to Dudley Farlin, same place. Filed July 26, 1883.

288,705. CAR-AXLE BOX: Geo. F. Godley, Philadelphia, Pa. Filed Sept. 19, 1883.

288,708. HEATER: Robert Johnson and John F. Buerkel, Boston, Mass. Filed Jan. 31, 1883. Renewed Oct. 20, 1883.

288,717. MACHINE FOR GRINDING CAR-WHEELS: Augustin W. McIntyre, Chicago, Ill., assignor, by mesne assignments, to the American Car-Wheel Grinding Company, same place. Filed June 9, 1882. Renewed May 19, 1883.

288,718. GRINDING-MACHINE: Augustin W. McIntyre, Chicago, Ill., assignor, by mesne assignments, to the American Car-Wheel Grinding Company, same place. Filed Dec. 8, 1882. Renewed Sept. 24, 1883.

288,719. AUTOMATIC CAR-BRAKE: John D. Meenan, Ridgway, Pa. Filed June 16, 1883.

288,754. CAR-COUPLING: Myrick R. Allen, Lewisburg, Tenn. Filed Oct. 13, 1883.

288,760. DUMPING-CAR: Andrew Beckert and William E. Ludlow, Sandusky, Ohio. Filed April 2, 1883.

288,779. CAR-SPRING SUPPORT: William Don, New York, assignor to William White, White Plains, N. Y. Filed Sept. 1, 1883.

288,780. CAR-AXLE BOX: William Don, New York, assignor to William White, White Plains, N. Y. Filed Sept. 1, 1883.

288,788. REVOLVING GUARD FOR LOCOMOTIVE COW-CATCHERS: John D. Fisk, Hartford, Conn. Filed Feb. 5, 1883.

288,789. CAR-COUPLING: James Henry Flood and Henry Frederic Knoder, Cardington, Ohio. Filed March 3, 1883.

288,792. FREIGHT-CAR: Abram Goodrich, Auburn, N. Y. Filed Nov. 8, 1882.

288,797. CAR-COUPLING: Joseph V. Hartman and Albert Wetzel, Jr., Linwood, Ohio. Filed April 28, 1883.

288,800. CAR-COUPLING: Chancey C. Haskin, Waltham, Iowa, assignor of two-thirds to James E. Haskin and Erwin D. Mereness, both of Westside, Iowa. Filed June 20, 1883.

288,816. CAR-COUPLING: Abner Johnston, Cornwall, assignor of one-half to Nelson Secor, New York, N. Y. Filed Aug. 21, 1883.

288,817. CAR-WHEEL: Edward J. Kelly, Monongahela City, Pa. Filed Aug. 2, 1883.

288,832. SPARK-ARRESTER: Joseph Meier, Plainfield, N. J. Filed March 8, 1883.

288,848. STEAM HEATING APPARATUS FOR RAILROAD ROUND-HOUSES: Eugene F. Osborne, St. Paul, Minn. Filed March 31, 1883.

288,890. CAR-AXLE BOX: John G. Thomas, Little Falls, N. Y. Filed Sept. 13, 1883.

288,903. RAILWAY-TRACK CLEANER: Geo. W. Willey, Athol, Mass. Filed Nov. 9, 1882.

288,907. RAIL-SUPPORTER: Robert H. Wingate, Wesson, Miss. Filed April 27, 1883.

288,914. DRAFT-REGULATOR: Henry D. Bannister, Chicago, Ill., assignor of one-half to Roland H. Smith, Pittsburgh, Pa. Filed March 16, 1883.

288,925. CAR-COUPLING: George Costolo, Mary Jane Costolo, and Alfred Johnson, Uniontown, Pa.; said Johnson assignor to said George Costolo. Filed Sept. 19, 1883.

288,926. SLEEPING-CAR: Lawrence Creighton, Cincinnati, Ohio. Filed May 15, 1883.

288,928. CAR-COUPLING: Fieldon B. Cunningham, Burlington, Kans., assignor of one-half to Chas. O. Brown, same place. Filed Aug. 28, 1883.

BEARING DATE NOVEMBER 27, 1883.

288,969. CONTRACTING CAR-WHEEL CHILL: Jacob N. Barr, Milwaukee, Wis. Filed July 16, 1883.

288,988. CAR-DOOR LOCK: Joseph H. Fisher, Deerfield, Ill. Filed March 14, 1883.

288,999. CAR-COUPLING: John H. Harrod, Huntsville, Ohio. Filed June 4, 1883.

289,001. ROLL FOR ROLLING CAR-COUPLINGS: Jos. W. Higgs, Sharon, Pa. Filed May 16, 1883.

289,002. CAR-COUPLING: Isaac Holland, St. Peter's, Mo. Filed Sept. 26, 1883.

289,006. CAR-SHIFTER: William H. Lind, Williamsport, Pa. Filed Sept. 29, 1883.

289,008. AUTOMATIC CIRCUIT-BREAKER FOR RAILROAD-SIGNALS: Malcolm W. Long, Hyde Park, Mass. Filed April 16, 1883.

289,017. RAILWAY-VELOCIPEDE: George W. Miller, Kalamazoo, Mich. Filed April 13, 1883.

289,040. COMBINED RAILWAY AND CATTLE WATER-SUPPLY: Charles P. Sykes, Calabasas, Ariz. Filed Oct. 31, 1883.

289,049. CAR-COUPLING: John A. Whittemore, Springfield, Mass. Filed July 17, 1883.

289,091. AUTOMATIC CAR-BRAKE: William B. Guernsey, Norwich, N. Y., assignor, by mesne assignments, to The Torrey Automatic Brake Company, of New York. Filed Oct. 20, 1881.

289,128. CAR-BRAKE: James O'Donnell, San Francisco, Cal. Filed July 14, 1883.

289,142. CAR-WHEEL: Edmund K. Righter, Oswego, N. Y. Filed Aug. 24, 1883.

289,160. CAR-TRUCK: James E. Squire, Glencoe, Ontario, Canada. Filed April 26, 1883.

289,172. CAR-COUPLING: Benjamin Taylor, Morrillton, Ark. Filed Oct. 12, 1883.

289,226. FUEL-FEEDING DEVICE FOR LOCOMOTIVES: John W. Cloud, Altoona, Pa. Filed March 7, 1883.

289,228. CAR-COUPLING: John Cochran, Jr., Millwood, assignor to himself, and John A. Wirick, Clarksville, Mo. Filed June 26, 1883.

289,244. RAILWAY-GATE: Calvin A. Ely, Taylor Hill, Ill. Filed June 14, 1883.

289,247. GRAIN-CAR DOOR: Benjamin H. Gatton, Bath, Ill. Filed May 14, 1883.

289,254. SAFETY-SWITCH GUARD: Henry Harmer, Southampton, Ontario, assignor to Frederick Broughton, Hamilton, Canada. Filed Aug. 16, 1883. Patented in Canada Aug. 22, 1874, No. 3,770; extended Aug. 20, 1879, No. 10,375.

289,265. HEATING RAILWAY-CARS: Michael Hurly, Quebec, Quebec, Canada. Filed Feb. 26, 1883. Patented in Canada May 4, 1882, No. 14,702.

289,298. RAILROAD-RAIL JOINT: Jacob E. Moeller, Centralia, Ill. Filed June 25, 1883.

289,313. BRAKE-SHOE: Gustavus B. Simonds, Sedalia, assignor of one-half to Archibald J. Robertson, St. Louis, Mo. Filed June 20, 1883.

289,314. CAR-BRAKE: George A. Small, Jeffersonville, assignor to Josiah Bettis, New Albany, Ind. Filed April 18, 1882.

289,346. SLEEPING-CAR: Henry S. Hale, Philadelphia, Pa. Filed Aug. 9, 1883.

289,357. CAR-COUPLING: Joseph K. Nyce and Irwin C. Hunsicker, Shippack, Pa., assignors to themselves, William D. Heebner, David D. Nyce and Isaiah A. Anden, all of same place. Filed July 6, 1883.

Barry's Steam Valve.

THOMAS P. BARRY, Stillwater, New York, believes that his steam valve, patented October 2, 1883, can be used on locomotives as a throttle valve. His invention has relation to valves for regulating or controlling the flow of steam under pressure; and it consists in the detailed construction and combination of parts of a valve, suitable for all purposes for which valves of this class are usually employed.

The claim includes the combination of a valve-chest having ports, a valve-seat made in one piece with the bottom of the valve-chest, and having ports at right angles to one of the ports of the chest; a sliding valve consisting of a sleeve, yoke, shoulder, valve-stem and spring, projecting with its lower free end down into a circular recess in the top of the valve-chest, and adapted to fit the shoulder of the valve.

Railway Station Indicator.

A PATENTED invention of Parker Price, Sandy Run, Luzerne county, Pennsylvania, has relation to railroad station indicators. In the absence of illustrations, a description must necessarily be brief, but the inventor will give further particulars in answer to inquiries.

Described generally, the invention consists of a case or cabinet containing two outside rollers, and two other rollers working inside or within them. On one of the outer rollers, a tape with the names of the railroad stations along the road between given points printed thereon or otherwise affixed thereto, is wound and arranged to be unwound therefrom and wound upon the other outer roller, to display the names of the stations through a window of the cabinet as they are reached, and thus save the conductor or brakeman the trouble of calling out the names of the stations, as is now practiced.

Under the present system of shouting the names of stations just before they are reached, the din of the moving train is alone sufficient to drown the voice of the conductor or brakeman, and, in addition to this, very few of the persons detailed to perform this duty articulate distinctly; hence many mistakes and much confusion result from the present system. In Mr. Price's improvement, the cabinet is placed in the front of the car, or one may be placed at each end of the car, to save turning the car or causing the passengers to turn in their seats to see the name of the station displayed.

A gong may be struck to attract the passenger's notice, or the name may be called at the time it is displayed by the conductor or brakeman, or other attendant. Two outer rollers are used, in order that the printed tape may be wound from one to the other to display the station in proper succession on both the outgoing and incoming trips.

The claim on the Price railway station indicator reads about as follows:

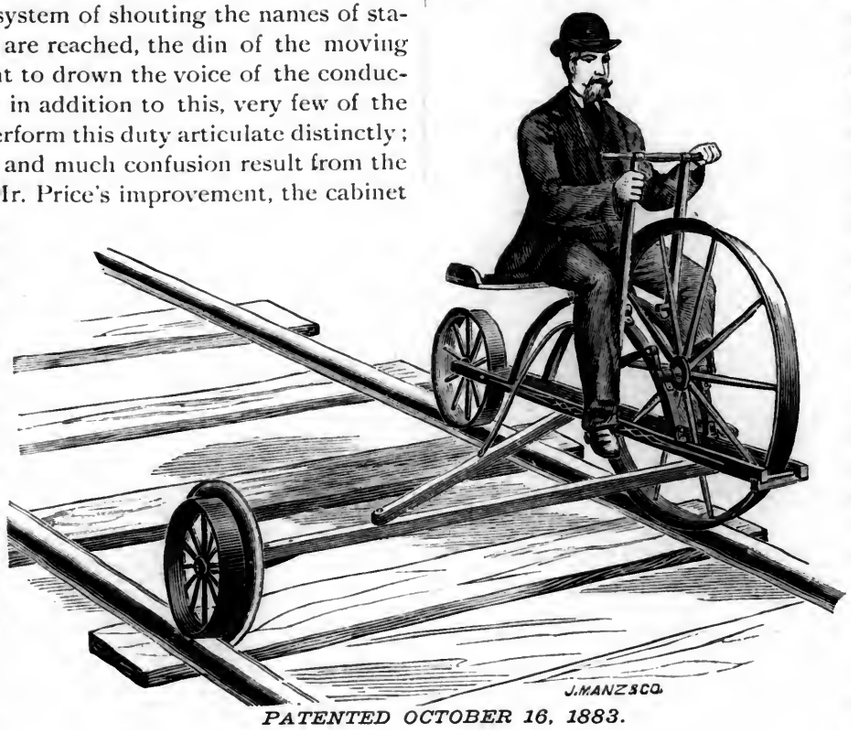
1. The combination of an inner roller upon a shaft having bearings in the end walls of a cabinet and an outer or encircling cylinder or roller having a friction face on one end and a friction groove near the other end, with a disk having an opposing friction face, a spring pawl and ratchet on its adjacent face, and a series of stops near its periphery on the other face, a sliding and locking rod for bringing the disk and outer cylinder into contact and holding them locked, and a spring-stop catch and an operating spring for moving and stopping the rollers and disk when in engagement.

2. In a station indicator for passenger cars, the combination, with the rollers having the friction grooves near one of their ends, and mechanism for rotating them, of the sliding push-rods having pivoted arms which engage the friction grooves for sliding the rollers into engagement with their respective disks, and springs for holding the disks and rollers out of engagement, and inclined stops on the push rods, and inclined projection on the cabinet walls, to lock the rollers and disks in engagement.

The advantages of an indicator of this kind are obvious.

The Eclipse Railway Velocipede.

THIS device, manufactured by E. B. Preston & Co., Chicago, Ill., is clearly shown in the cut. The advantages claimed for it are simplicity of structure, lightness of weight, 100 pounds; it can be easily lifted from the track by one person; the highest practical rate of speed attainable with the least expenditure of manual force; the force is applied direct to the driving wheel, there being no cog gears; it has but few parts, and is, therefore, not liable to get out of order; it can be worked by both the hands and feet, or by either separately; and it will carry either one person, as shown in the cut, or two, one on each side of the wheel, and both in convenient position to work the lever. The Eclipse velocipede has been thoroughly tested, and is highly indorsed by mechanics and railroad men competent to judge of its merits.



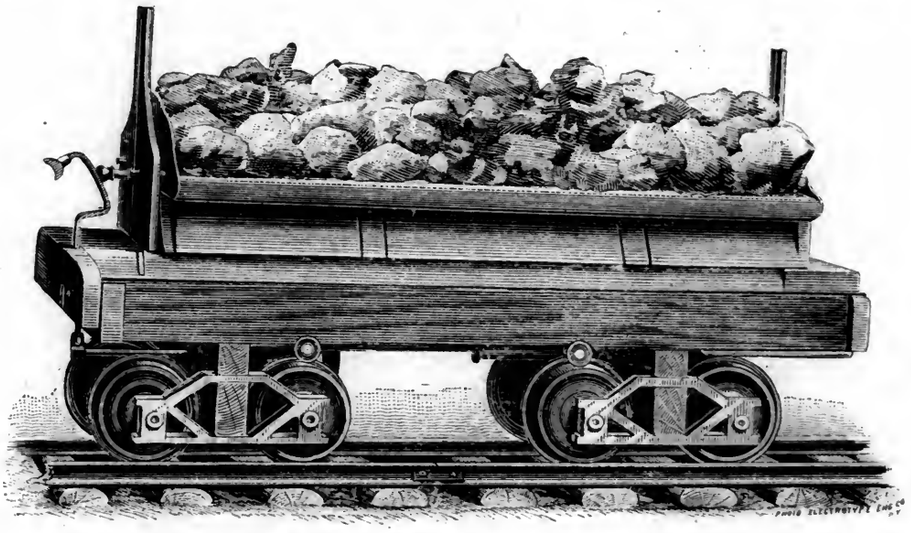
THE ECLIPSE RAILWAY VELOCIPEDE.

THE car coupling invented by Christian H. Zimmerman, of Le Roy, Ohio, is so constructed that the pin is raised by a lever, and held raised in position for coupling by means of a block sliding inside the drawhead. It is a self-coupling apparatus. All the brakeman need do after the cars are slacked together so as to loosen the pin, is to raise the lever. When the car is pulled ahead, the pin is raised a little higher, and the lever thereby released, and at the same time held in position for coupling; so that the person attending to the coupling can stand at one side out of danger.

NEW CAR-AXLE LUBRICATOR.—A patented invention of William J. Jackson, Osceola Mills, Cleary county, Pennsylvania, consists of a car-wheel axle lubricator in which the hub is strengthened, the axle continuously and uniformly lubricated, the escape of the lubricant and entrance of dirt are prevented, and a collar is provided for connecting the wheel and axle, the same being lubricated and inclosed as explained by the inventor, together with all details of the invention, in answer to inquiries addressed to him.

Fallon's Universal Dumping Car.

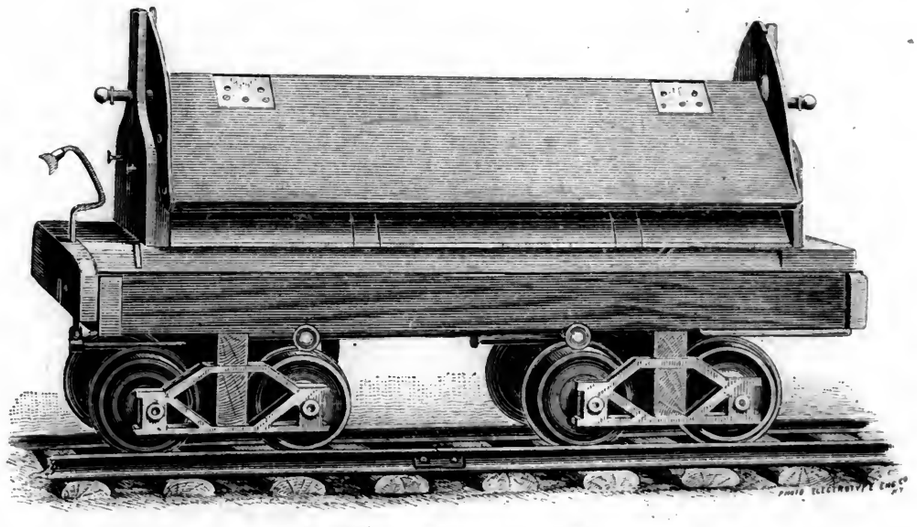
THIS invention, patented in the United States October 30, 1883, is one of great interest and importance. It is the device of Mr. William Fallon, of Newburgh, New York, who has applied for patents in Canada, England, France and Germany.



FALLON'S DUMPING CAR—LOADED.

He claims for it that it will dump the load as required, all on the one side of the car, or on the other, or half on one side and half on the other; or in the event of running along the edge of a precipice, in ballasting a road, will dump half the load on the inside, and retain the other half of load on the car, to be placed elsewhere. Moreover, the new car will dump the load while at rest on the track. In the matter of building roads, it will be found a great labor-saving machine. The invention is also applicable as a grain or coal car, as it transfers bulk immediately, such as coal (large or small), earth, rock, ore, ballast, salt, and grain of all kinds. Its utility, therefore, in transferring grain to the seaboard without the aid of elevators, promises to be of the greatest importance in the saving of time and labor. In the repair of washouts on railroads, and similar operations, the Fallon car would be found of great service, because it delivers its load while in motion at the rate of from three to five miles an hour. Hence the engineer can dump the whole train at once or in detail, and the contents of the whole train can be dumped in any particular spot. For analogous reasons, the car would be of the greatest service in repairing crevasses, and such other similar purposes which require rapid filling in. Several railroad men and eminent engineers have passed a favorable opinion on the car already, and its extensive use in the near future seems to be assured.

The principle of its construction, is changing an ordinary car or gondola truck into a dumping car, by means of two pinions clamped on the inner axles, with two intermediate wheels geared into two racks, which slip in and out of gear on a sleeve axle suspended from the bottom of the car by proper fastenings; thereby, when thrown in gear with said racks, elevating the dumping platform in the center line, and thus dumping the load, which falls by its own weight.



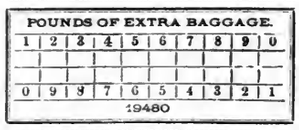
FALLON'S DUMPING CAR—EMPTY.

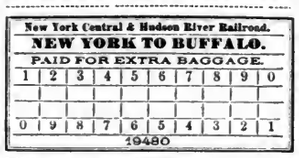
For further information, address William Fallon, Newburgh, New York.

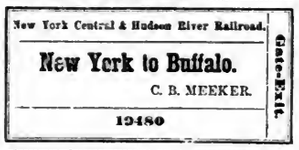
A Registered Passenger Ticket for Railroad Companies.

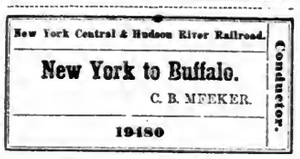
LETTERS PATENT were issued November 13, 1883, No, 288,594, for a registered passenger ticket, to James H. Mandeville, trustee, of Washington, D. C., the inventor thereof being John M. Reynolds, of Pultneyville, Wayne County, New York.

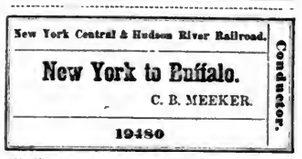


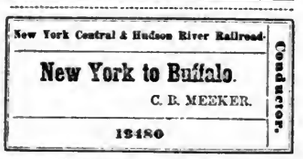


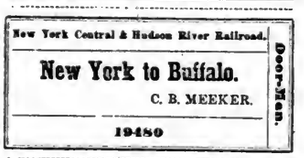


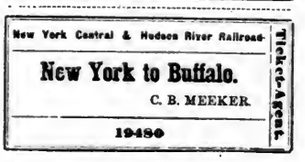












This ticket is designed to check all frauds put upon the ticket department of a railway company, whether by the traveler or by the inside officials of the company. Its object is to enable a company to secure against spoliation the entire revenue of its passenger traffic, including all moneys paid for excess baggage. Further, to abolish the scalping business, and the sale of tickets in large blocks upon speculation; to prevent the printing of tickets or passes not accounted for, and the use of a ticket more than once.

Mr. Reynolds registers the ticket before it is placed upon sale, just the same as a Government bond is registered. This will check the high officers in the ticket department. Each ticket is printed in a separate color for each division of the road, and if it covers more than one division or more than one railroad, then it is printed in combined colors. This prevents counterfeiting, and the changing of a ticket by means of chemical process, although counterfeiting, or the duplicating of tickets, would be detected by the registry of the ticket.

Mr. Reynolds's ticket-head has a list of stations on it from starting point to destination, which, like the rest of the ticket, is printed in different colors, provided the ticket is for more than one railway division. To illustrate: The New York Central and Hudson River Railroad has three divisions, New York to Albany, Albany to Syracuse, Syracuse to Buffalo. Any ticket from New York to Albany would be printed on a blue blank, thence to Syracuse on a white blank, and thence to Buffalo on a red blank. A ticket from New York to Buffalo would be printed upon a blank having all three colors.

Mr. Reynolds provides his ticket with a coupon for every employé who handles it, namely: the station ticket agent, entrance gateman, conductor of each division, and the exit gateman. Between this last coupon and the ticket-head is a double baggage coupon, one part of which is punched to show the number of pounds of extra baggage carried, the other part being punched to show the amount of money paid therefor, by the passenger.

The several coupons when detached are independently accounted for by each employé, daily, to a coupon department, which is attached to the main offices of the company. The coupons would all flow into the main office regularly, unless a passenger stopped over on his journey. As they pour into the coupon office by the thousand, there being at least four coupons to every ticket, their separation is facilitated by the coupons being of different colors, and by each day's return of coupons being kept separately. Every ticket has the same number of coupons on it unless it goes over more than one division; then there are additional coupons for each division conductor. These coupons, after assortment according to number, if found all returned, are destroyed daily. If not all found, it is at once known precisely upon what employé to lay responsibility for any failure to perform his official duty.

This, for example, is the operation of a through ticket from New York to Buffalo. The station ticket agent upon its sale to a passenger, tears off his coupon and drops it into the cash drawer. At close of the day he sends his cash to the main office with his coupons enclosed as vouchers. He is checked on fares received. When the passenger goes through the entrance gate, the gateman tears off his coupon, and at close of the day he sends his coupons to the coupon office. He checks the station agent, and prevents any one from entering the train without a ticket.

On first round of the conductor out of New York, he tears off his blue coupon immediately on its presentation, and punches off the stations on the blue portion of the ticket-head, or from New York to Albany. It may be claimed that a conductor could never do all the punching required. It is answered that a passenger holding a through ticket would take an express train, which stops only at principal stations. In that case, the conductor would punch off only those stations where the train stops. In practice, however, it may be found sufficient to punch only the terminal stations of each railway division. If a passenger desires to stop off he must notify the conductor, who then doubly punches the station where he alights. When the journey is resumed the conductor is apprised of a stop off, as his blue coupon already has been removed. He then cancels the stop off by a third punch, and just before reaching Albany he makes three more punch marks on the ticket-head opposite Albany. This cancels the ticket-head from New York to Albany, and it is of no further value to the passenger for securing another ride on his ticket for any part of the distance over that division. The punching is done in spaces arranged opposite to each station, in order to preserve from mutilation the printed matter on the ticket-head. There is an extra row of punching spaces wherein the baggage

agent at any station indicates that a passenger has withdrawn his baggage from the custody of the company.

Upon leaving Albany the new conductor at once after the handing up of the ticket, tears off the white coupon between Albany and Syracuse, and punches off the stations on the white portion of the ticket-head wherever the train stops in going over that division; and just before reaching Syracuse he puts three more punch marks on the ticket-head opposite that station, to indicate that the passenger has been carried clear over another division.

Upon leaving Syracuse a new conductor tears off the red coupon, and punches off the stations on the red portion of the ticket-head between Syracuse and Buffalo; but on his last round he takes up the canceled ticket-head and hands back to the passenger the exit gate red coupon with a part of the double baggage coupon (provided a punch mark thereon indicates that the traveler has excess baggage) with which to show the station baggage agent that the required sum was paid for carrying his baggage, or that it was not paid for one distance but carried a farther distance. These red coupons are surrendered to the exit gateman and the baggage agent, who return their coupons daily to the coupon office. The exit gateman is provided with a punch set with figures, to punch out the number of his station upon the exit gate coupon wherever a passenger goes through this gate, but who retains his ticket. This will prevent a passenger from improperly using his ticket a second time. The exit gateman could make a conductor responsible for permitting a traveler to ride free, or to ride a farther distance than he paid to ride.

Mr. Reynolds is the first inventor of a registered passenger ticket, and of a local ticket (that is, a ticket isssued by a single railway management) with coupons, and of a ticket-head with names of stations upon it; and of a ticket in different colors for each division of the line, or each connecting railroad covered by one ticket; and to devise a system of independent accountability by the various employés of a company, whereby each one checks not only his own operations but as well the acts of all other employés who handle the ticket.

Manifestly, the use of this ticket would enable a railway company to dispense with road checks, conductors' checks, duplex tickets, and all other ticket safeguards of that character now in use, and would enable a passenger always to hold his ticket until he had reached his destination.

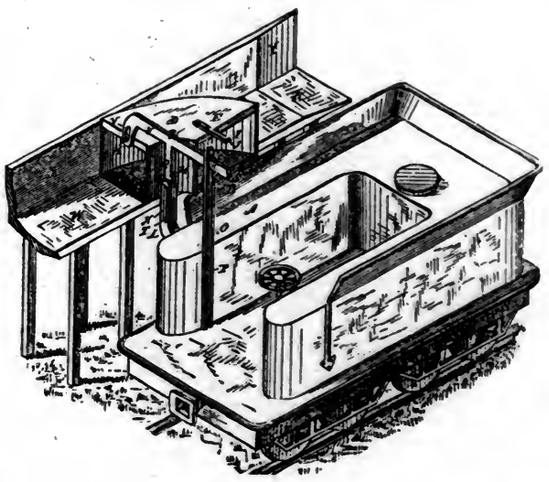
Stock Car.

THE stock car invented and recently patented by James Clark Weaver, of Cutler, Carroll County, Indiana, has been assigned to Acker & Felthoff, of Darcy, in the same county and State. It consists of improvements in the construction of stock cars, and contrivances for feeding and watering the stock, and also for partitioning the car, whereby it will be more substantial, the stock may be fed and watered without the trouble and delay of removing them from the car, and they may be separated at any desired place along the car.

The claim covers certain spring racks located within the car and along the sides to receive the hay stuffed in through the openings of the sides; also the combination, with a stock car, of a partition suspended on pivots, and having pivot bearings adjustable along the beams of the car.

Device for Coaling Locomotive Tenders while in Motion.

MESSRS. M. H. LANTZ and N. T. Clivenger, of Marionville, Lawrence county, Missouri, believe that they have overcome the hitherto supposed impossibility of taking coal on the tender of a locomotive while the train is running, and are the patentees of a device which, they claim, will enable this to be done, while the train is moving at the rate of from fifteen to forty miles an hour.



The device is simply a large tube attached to the tender by hinges, and is raised or lowered by a lever. There is no need of any elevated track or expensive coal houses, but simply a platform by the side of the main track, and parallel to it, which is kept supplied with coal. As the train approaches it the tube is lowered, by operating the lever. As the train passes, the tube scoops in the coal and conveys it to the tender, when the tube may again be elevated, the train being all the time in motion. The platform should be about the height of the top of the tender, along the track, and large enough to hold any desired quantity of coal. One could be built at every convenient coaling station.

Wharton's Automatic Arrangement for Transferring Cars from one Track to Another.

AN invention of more than ordinary importance has been patented by William Wharton, Jr., of Philadelphia. It consists of mechanism whereby a transfer truck on receiving a car from one track will be automatically transferred to a position where the car can be wheeled on to another track, the truck on being relieved of its load returning automatically to its first position, ready to receive another car. The subjoined brief description illustrates its application to the terminus of a street railway, with the outgoing slightly lower than the incoming track. At right angles, or nearly so to the tracks, but five inches lower, is an inclined track, to the rails of which are adapted the wheels of a transfer truck, the movement of which is limited in both directions by bumper posts; or any other available devices may be used for limiting the movement of the truck. Two rails are secured to the transfer truck, and when the latter is in contact with the first bumping post, these truck rails will coincide with those of the incoming track; but when the truck is in contact with the

second bumper post in the opposite direction, the said truck rails will coincide with those of the outgoing track. A rope or chain is attached at one end to the transfer truck, passes over a pulley and down a pit, and carries at its lower end a weight which maintains the said truck in its most elevated position when unloaded. The weight is such, however, and the track is so inclined that when a car has been transferred to the truck its additional weight will cause the same to slowly descend the inclined track, and to raise the weight until the the truck reaches the second bumping post, when the car carried by the transfer truck may be wheeled to the outgoing track by the horses which have been in the meantime detached from the car and taken across to their proper position on the outgoing track. As soon as the truck, however, is relieved from the weight of the car, it will be restored to its first position by the counter-weight. It will thus be seen that the transfer truck is automatically moved from the position where it receives a car from the incoming track, to a position where the car can be wheeled to the outgoing track, and that as soon as the car has been hauled from the truck the latter will be automatically restored to its first position, ready to receive another car from the incoming track. The incoming track is slightly inclined downward toward the transfer truck, from a point where the horses can be conveniently detached, so that the car will pass automatically down the inclination on to the said truck, where it is arrested by a projection or projections on the same. It is not essential that the truck should be counter-weighted in the precise manner described, but in most cases the plan described will be adopted.

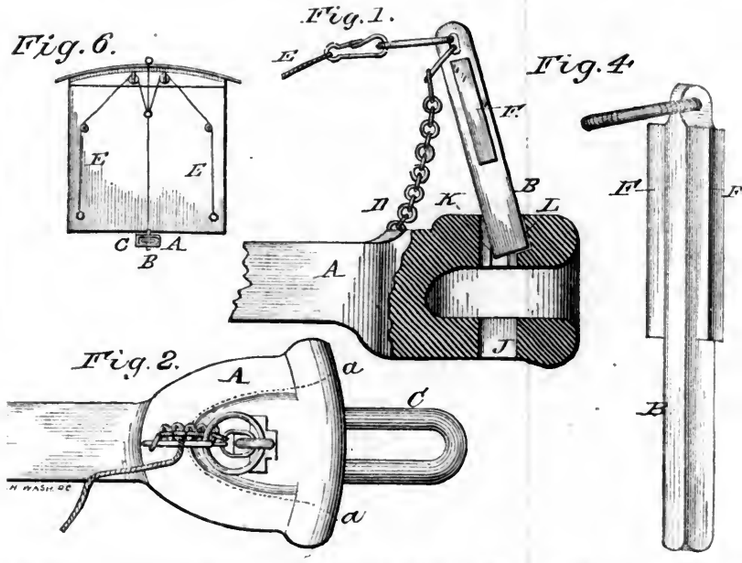
The needed inclination of the tracks amounts to a few inches only. This arrangement is in use at the Sands street station of the Brooklyn City Railroad, where there are three of these automatic transfer tables, which are adapted to three sets of incoming and outgoing tracks. The considerable saving in time, and the avoidance of all expense for attendants is there shown very clearly.

Woodward's Car-Coupling.

THIS invention, by Ferd. Woodward, No. 708 Eleventh street, Sacramento, California, relates to that class of car-couplings in which the common link and draw-head are employed in automatically coupling up railroad trains, and where the coupling-pin may be operated from the side or top of the car.

Fig. 1 is a side elevation, showing a portion of the draw-head cut away, to show the interior of the same, and the position of the coupling-pin when it is withdrawn to uncouple the car or draw out the link. Fig. 2 is a plan view, where the pin is dropped in position, with the wings resting upon the link, and by its weight holds the link at its outer end above horizontal. Fig. 4 is a perspective view of the coupling-pin. Fig. 6 an end view of a box car, to show the position of the cord by which the coupling-pin may be operated from the side or top of the car. *A* represents the draw-head; *B* the coupling-pin; *C* the coupling link; *D* the coupling-pin stop chain; *E* the coupling-pin cord by which the coupling-pin may be operated; *F* the rest wings of the coupling-pin; *J* the coupling-pin mortise; *K* the wing slots; *L* the rest notch to hold the pin ready for coupling.

With the link *C* held at the proper elevation and direction by the weight of the pin *B* and the form of the link seat, as in Fig. 2. The opposite car to be coupled will have the pin raised, as in Fig. 1, and resting in the notch *L*, where it will always catch when the pin is lifted either by the ring in the top of the pin, or by pulling on the cord *E*, at the top or either side of the car. The tension and



weight of the stop chain *D* in checking the upward motion, throws the top of the pin back, and the lower end forward into the rest notch *L*. As the moving car comes up, the link *C* passes into the draw-head, the bumpers come together, and the jolt of the concussion throws the top of the pin forward, causing the lower end to slip out of the rest notch, and the pin to drop down through the mortise *J*, the rest wings *F* dropping upon the link, coupling the cars.

Various other devices can be used to lift the pin on flat or other cars, if necessary. To prevent coupling, drop the ring at the end of the cord over a knob or hook, or drop the coupling-pin in place when the link is out.

The Rosenfield Railway-Car Gate.

IN many classes of railway cars, and particularly in those used upon the elevated and other city railways, it has been found necessary, in order to prevent passengers from falling from the train, and also to prevent persons from attempting to get off or on a car while in motion, to provide the entrances to the car platforms with gates, by which they can be closed except at the proper times. These gates are usually in charge of a guard or attendant, whose duty it is to close the gates before the train commences to move, and to open them only after the train has come to a full stop. As there is usually but one guard or attendant stationed between each two adjoining cars, it follows that to open or close both gates he must pass around from one to the other of the adjoining platforms. It is the object of the Rosenfield railway car gate, among other things, to provide means by which the guard or attendant can, without changing his position, open or close both gates simultaneously and with the least possible delay. To that end, one feature of the invention consists in providing the gates with connections so arranged that any two adjoining gates can be simultaneously opened or

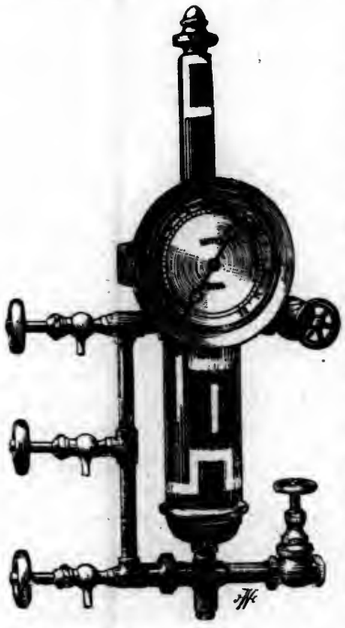
closed by the guard, while standing in the passage way leading from one of the cars to the other.

In order to adapt cars to run upon a track in which there are abrupt or comparatively abrupt curves, which is the case with most city railways, it is necessary that the platforms should be so constructed as to leave considerable open space at the sides between the platforms of two adjoining cars, when they are standing upon a straight track. This open space has frequently been the cause of serious accidents to persons who have been crowded from the station platform, and fallen between the platforms of the cars. Another object of the Rosenfield railway car gate, is to provide means by which this danger shall be avoided; and to this end another feature of the invention consists in providing a gate which can be operated, in connection with one of the platform gates, to close this space and prevent persons from falling or being crowded into the same while the train is standing at a station.

These important objects commend attention to the new car gate, on which letters patent have been issued to William W. Rosenfield, of New York city. Our space does not admit of a detailed description, which can be obtained from the patentee, Mr. Rosenfield, at the Home Vapor Bath Company's office, 1238 Broadway.

High and Low Water Indicator and Alarm for Steam Boilers.

THE accompanying cut illustrates Edward J. Coffin's High and Low Water Indicator and Alarm for Steam Boilers, which is claimed to be the most durable and reliable indicator of any yet patented and placed in the market.



This indicator being constructed wholly of iron and brass, and involving the simplest mechanical principles consistent with the proper performance of its work, is not liable to get out of order. The dial representing in inches the height of the water above the crown sheet, or flue line, gives a more correct registry by means of the dial hand, of the water in the boiler unaffected by foam, than the common glass gauge so largely in use at the present time; while it completely obviates the liability of breakage, which, with the best glass gauges is a very frequent occurrence, and is always a source of vexation as well as an item of cost. It is simple in construction, cheap, and as to its durability, one will last a life-time. It may be attached to any steam boiler—stationary, locomotive, or marine—and it will correctly indicate the height of the water twelve inches above the crown sheet or flue line. If it is attached above the crown sheet, or flue line, add the number of inches which it is placed above to the indication of the dial-hand on the dial-face, and the registry is ascertained.

The alarm mechanism is simple and trustworthy, giving a steam whistle alarm if the water is too high or too low in the boiler. When attached to locomotives or steam fire-engine boilers, the try cocks and the alarm mechanism are not necessary. The try cocks are attached to the cylinder of the indicator by means of steam pipes and Ts, and are only necessary when there are no try cocks on the boiler, and the indicator is attached to the boiler in the place of a "stand pipe" or "water column." The cylinders of all the indicators are tapped and plugged, and the try cocks may be placed on them when so desired. The steam-gauge may be placed on the indicator just above its dial case when it is used instead of the "stand pipe" or "water column," thus making the indicator a complete piece of boiler furniture. At night one gas jet will then serve to read the steam and water indications of the boiler.

This device has been in successful operation on several boilers in Central New York for more than a year last past, and is giving the best of satisfaction. It was patented Oct. 2d, 1883. The inventor is a resident of Little Falls, New York.

Automatic Railroad Signal.

CHRISTIAN M. RAFFENSPARGER, Hanover, York county, Pennsylvania, is the inventor of the railroad signal referred to in the following article. His patent is dated November 6, of the present year. G. Milton Bair, also of Hanover, has been assigned one-half interest in the invention, which is designed for use at railroad crossings to indicate the approach of a train, and is of that class of signals in which the signal is given or operated by the engine as it approaches a crossing. Its principle is the employment of a jointed lever and a signal staff connected thereto, adapted to be depressed and set by passing trains, combined with devices, connected, respectively, to the lever and staff, for breaking the shock of impact of the train thereon. The inventor does not restrict himself to the use of a staff having a flag at its end as the signal, as any device having enough area to make it sufficiently conspicuous for the purpose indicated, may be substituted. He believes that his invention affords a simple, effective, and cheap appliance for railroad signaling, and that its use at crossings will result in much saving of life and property. At many crossings a railroad company is not justified in employing labor for signaling purposes, and the object of Mr. Raffensparger's invention is to supply an automatic appliance which may be relied upon as an efficient substitute. He will send full particulars to inquirers.

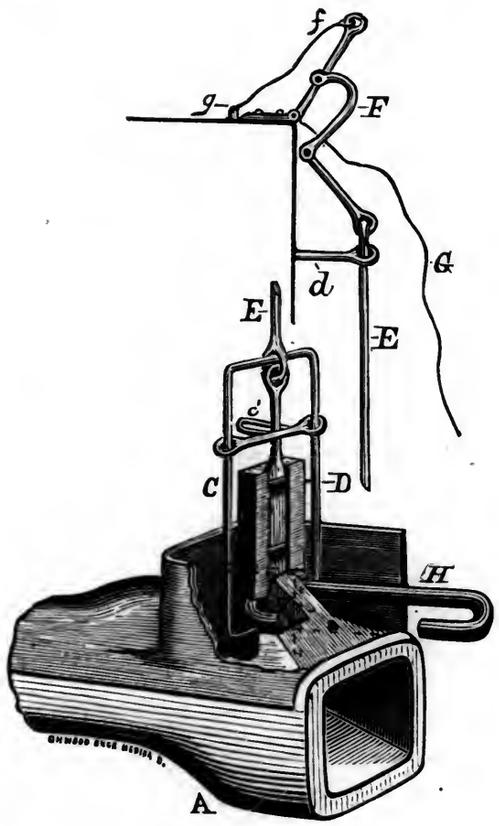
Morrison's Car Coupling.

THE operation of the automatic car coupling, invented by R. T. Morrison, of Medina, Ohio, is as follows:

The coupling-link when held at one end by a draw-head, may be coupled at the other end by thrusting it into the chamber of the draw-head, where it will slide up on the incline of the pin *A*, and push back the weight *D* and drop behind the said coupling-pin, the weight *D* immediately swinging back to its former position, and holding the link from disengagement with the said pin.

It will be seen that the back part of the bottom of the

chamber, from the front part of the pin *A* backward, is about horizontal, so that the weight *D*, hanging just above the end of the link, would hold the said link in nearly a horizontal position, and will guide it into the chamber of an opposite and similar draw-head. If the opposite end of the link were depressed, it would only pry upon the weight *D*, and cause it to slide up on the rod *C*, and with-



out any disengagement of the link and pin; also the flaring shape of the said chamber gives a free lateral motion to the link beyond its requirements in actual use. The weight *D* cannot slide upon the rod far enough to admit of a disengagement of the coupling-link and draw pin. The combination of the lever *F* and the upper part of the rod *E*, forms a toggle joint, which by the gravity of the parts, passes a straight line and rests against the car as shown, preventing the frame *C* from being raised in any manner by the link. When it is desired to disengage the said link and the said pin, it may be done by pulling on the cord *G*, which by the means of the lever *F* and the rod *E*, will raise the frame *C*, which in turn will raise the link above the pin *A*, and entirely disengage the said link. When one end of the link is disengaged or uncoupled, the engagement of the other end of the link with the opposite draw-head, holds the link in nearly a horizontal position, and ready again to enter a draw-head and be coupled. Of course the chamber might be covered, except so much of the space as is necessary for the operation of the frame *C*, and the weight *D*. The back side of the draw pin *A*, may be faced with iron or steel, in such a manner that the facing may be renewed when required, and protecting the pin proper from all wear. This device may be attached to an old or existing draw-head, or a new draw-head may be inserted or attached to the bar, with the face or draw-head here deseribed.

The Guillaume Sleeping Car.

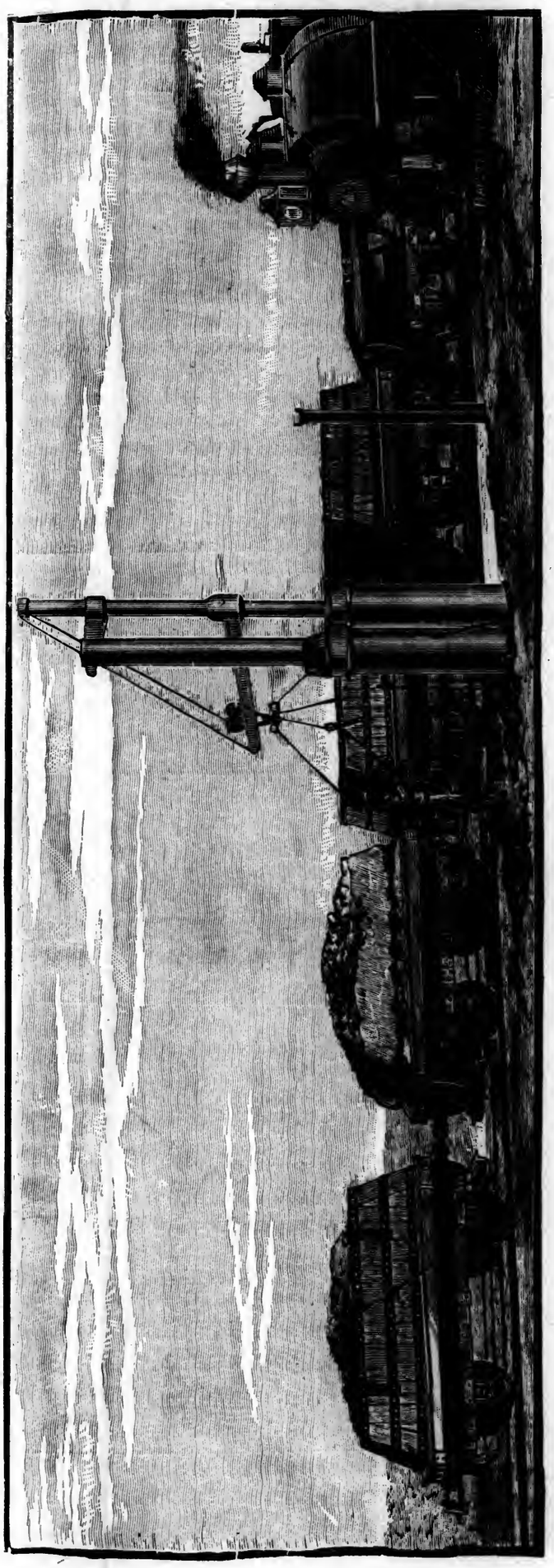
THIS is an invention of Henri Guillaume, of Washington, D. C., who has secured United States letters patent on it. Its primary object is the isolation of the compartments. Hence absolute privacy to the individual or family occupying a section, providing all accommodations necessary to comfortable sleeping apartments, constructing the berths or beds so as to convert the sleeping apartment into a parlor or saloon section, and, finally, providing a promenade all around the car for the occupants of the several sections. The means by which these desirable objects are provided, are indicated briefly in the claim, herewith presented in a shortened form. Letters addressed to the patentee will be promptly answered.

In a compartment car, a series of compartments each provided with lavatory and closet, and having their entrances and exits alternately from opposite sides of the car by a stairway and landing or a veranda; a series of compartments each provided with lavatory and closet, lockers for the bed supports and bedding, and having their entrances and exits alternately from opposite sides of the car by a stairway and landing or a veranda; a series of substantially octagonal sections each having a lavatory, a closet, and an entrance at the intersection of the several octagons, which form landings at that point; a series of substantially octagonal sections each having a lavatory, a closet, a locker for the bedding and berths, and an entrance at the intersection of the several octagons, whereby landings are formed for said entrances at that point; a series of substantially irregular octagonal sections having their entrances formed by one of the smaller faces of the octagon at the intersection of two of the sections, whereby landings are formed for said entrances; in a railway car, a car platform combined with a car body of less longitudinal and transverse diameters than said platform, whereby a passage or veranda is formed all around the car body; and a railway car composed of a series of sections or compartments having their entrances and exits upon opposite sides of the car alternately, in combination with a veranda or balcony surrounding the entire body of the car, as described.

Spengler's Car Mover.

THIS invention relates to the class of car movers which are adapted to be placed against the rear of a car, or under the center, against a cross beam, and on a rail of the car track, and operated by a lever to push the car forward. John Spengler, of Clarion, Iowa, is the patentee, and the assignor of one-half to Nicholas Francis Weber, of the same place.

The claim is the car mover having the slotted and wedge-shaped beam combined with two clamping jaws between which it is arranged, and the edged tongue adapted to bear on top of a rail, when the beam is forced against the said jaws; the combination, with the beam and clamping jaws, of the sliding bar adapted to be attached to the rear sill of a car, and the lever having links cnnnecting it to said bar, and the combination of the adjustable beam and clamping jaws, the sliding bar and lever for operating the same, and a clamp pivoted to the sliding bar and adapted to be attached to a part of a car, whereby the mover may be adapted to cars of different heights.



The Gartside Wrought Iron Dump Car.

THE accompanying cut represents the Gartside improved wrought iron dump car, now in practical use at the Lucy furnaces, Pittsburgh, Pennsylvania. This company has eighty-two cars and twenty-five boxes or chills, and ship on an average sixty cars of furnace slag per day, of five tons each, or three hundred tons per day. It is hauled from two to sixty miles as required by the Alleghany Valley Railroad Company, who use it for ballast to stop land slides, making ground for sidings, etc. The expense of this work to the furnace company is one locomotive with two crews working twelve hours each, consisting of engineer, fireman, conductor and one brakeman, who also handles the metal and coal. In unloading, three men dump a train of thirty cars in twenty minutes. The average repairs are less than those necessary to wooden cars.

The Gartside car in its present perfect state, is the result of six years' experimenting at an outlay, as given by the inventor, of over one hundred thousand dollars. It costs no more than an ordinary casting, and will stand all the expansion and contraction that can be put on it. The first one made has effected a saving of five hundred dollars for the first year, and is as good as new. Being very simple in construction, no tools are required to repair it but a drill press and a forge. Any part can be replaced without interfering with any other part. The car weighs 10,390 pounds, and the box weighs 3,590 pounds; total weight, 13,980 pounds. It sells for $612, or about 4½ cents per pound. The car can be made heavier or lighter as required. It is used for short hauls of pig iron, limestone, heavy castings, etc., and will carry a fifteen ton casting with ease; and is specially adapted for furnaces, rolling mills, steel works, foundries, etc., for handling hot material where wooden cars would burn; for railroad grading, tunneling, ballasting, etc. The claim is made for it that it is a great improvement on the wooden cars now in use.

In the cut the car next the engine, No. 162, represents the cars as they appear after dumping the load. The next one is empty, having the chill or bed placed and clamped in position and ready to be placed under the cinder trough, to receive its load of five tons of molten liquid slag. The next one is receiving a chill which has been taken off the next one, No. 183, by the steam crane, and showing the manner of changing the chills. No. 183 is ready to be hauled to its destination and dumped. The next or last car, No. 160, is a cold car, or one ready to have the chill removed, which the operator will effect and then place on the car next the engine, No. 162. The reader will notice that the contents of the last car, No. 160, project above the top of the chill, which is due to the expansion which takes place in cooling. The load in some cases expands 33 per cent., rising above the bed like a loaf of bread.

The chills are taken from the loaded cars and placed on the empty cars at the rate of thirty per hour, after which they are straightened, clamped and lined, which operation is performed by two laboring men at the rate of thirty per hour, at the same time keeping the yards and tracks clean. When the cars are required for hauling metal or iron of any kind, no sides are required. For stone ore and grading no bed is required, as it is more economical to build

the load by placing a wall of lumps around the outside and filling the center with fine stuff, for boiler ashes and similar light material. A stationary iron bed with hinged sides is preferable in the construction of an iron car. The principal difficulty the inventor had to overcome was to arrange the parts of iron which have no spring, in such a manner as would give the requisite spring or elasticity necessary to prevent its rapid destruction; or, in other words, when the engine strikes the end of a wooden car a hard blow, the sills and all other wooden parts give or bend, but on removing the pressure they spring back to their place, but when iron or soft steel is substituted the bend remains, and each succeeding blow makes the matter worse, until in a short time the car is knocked out of shape. In overcoming this difficulty, the inventor has combined a spring and oscillating movement, so as to make the whole car a mammoth spring, double acting, so that the pushing strain is directly opposite to the pulling strain at every part. An idea of the strength of the Gartside car can be formed from the following circumstance: By neglecting to clamp the chill to the car a leak was sprung and the contents ran around the wheels, burying them to the axle and chilling. Two locomotives were attached. After repeated pulling and pushing, it was brought out; damage, one bent axle. On another occasion a coupling broke, and four cars ran off the end of the dump track and rolled down an embankment fifty feet into the river; damage twenty dollars.

Joseph H. Gartside, 41st and Willow streets, Pittsburgh, Pennsylvania, is the inventor of the dump car named after him, and invites correspondence with persons wishing to build or use it.

W. P. Senour's Car Door and Fastening.

THIS recently patented invention relates to that class of car doors which is used in common freight cars to adapt the same to carry grain in bulk loosely; and it has for its object to provide an inner car door which will prevent the loss of grain, and means for securely fastening the same to prevent its being worked loose by jarring in transportation.

A facing of iron is secured to the side of the posts of the door frame, on their faces towards the inside of the car, and towards the doorway and on the top of the sill, to prevent wear and to provide a more secure fastening for the door bolts. The body of the door extends across the doorway, and laps on to the iron-plated inner faces of the door posts. Battens are rigidly secured to the door-body, on its outer face, for the usual purpose of securing strength with lightness, and at the same time furnishing shoulders to abut against the door posts, to keep the door from slipping endwise with the car. The door is secured in place by bolts adapted to slide into holes in the side posts. These bolts have each a peg to be struck by a hammer or anything convenient to assist in sliding the bolt when it becomes wedged. Each bolt is also turned outward at its rear end, forming an abutment to rest against a cross-key, which drops by its own weight between the forementioned bolts when they are extended into the bolt holes, to keep them in place. On the outside of the door, at each edge thereof, a plate of iron is first laid; then, at the middle of the door, a wider plate is placed. The bolts are laid on these plates and covered by bent straps. On the wider of the two plates is also laid the cross-key, and over it a strap, the two ends of which rest on the two straps above mentioned. These straps and plates are all firmly secured to the door by screw-bolts passing through them and through the door and batten, and closely drawn by screw-nuts on the inside of the door. To prevent losing the door bolts they are turned out at their rear ends, forming hooks behind the top straps. The cross key is similarly turned up at both ends for the same purpose. The door may be provided with a chain securing it to the car, yet allowing it to be housed in some convenient place near by the doorway when not in use, to prevent the same being lost or stolen. At their forward end the bolts are wedged on the upper and inner sides, to draw the door down and outward against the frame, thus preventing the escape of any grain, the lugs serving to force the bolts. The batten does not close down to the lower edge of the door, it being left up a little to admit a bar, so that the door may be pried up when stuck by the weight of grain behind it becoming settled in transportation.

What Mr. Senour claims for his invention is superior ease of management as compared with any similar service, it being impossible for a car provided with it to become packed so as to require more than a moment to open it. Moreover, shoveling grain away from the door can never become a necessity where this invention is used.

W. P. Senour resides at Pimento, Vigo County, Indiana.

Snow Excavator.

MINNESOTA, very aptly, is the birthplace of this device, which is the invention of Danthus P. Bier and Henry E. Ralph, of Marshall, in that State, assignors of one-third to Henry M. Burchard, land agent of the Winona & St. Peter Railway Company, and also resident in Marshall.

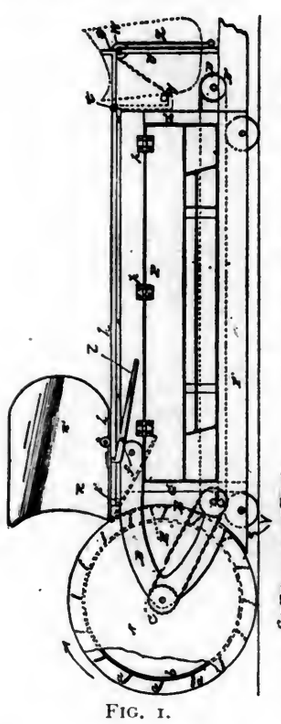


FIG. 1.

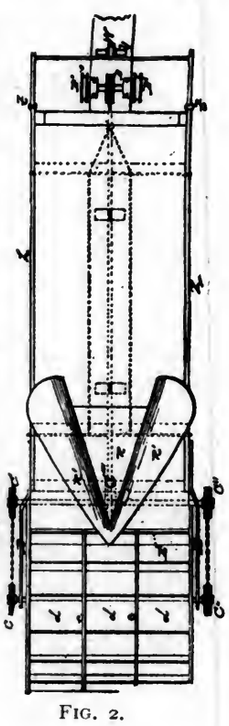


FIG. 2.

Fig. 1 is a side view of the excavator; Fig. 2, a top view, Fig. 3, a rear view, and Fig. 4, a cross sectional view.

Briefly described, this snow-cleaning machine is the

combination, with the rotating cutting-out drum A, in front, of a raised adjustable deflector in rear of the upper portion thereof, and supported on rails of a car or receptacle having centrally-hinged bottom sections and swinging sides. The elevated adjustable deflector before mentioned, has roller bearings engaging a C-shaped track, having a hinged end portion in rear, and devices for lowering said end portion when the deflector is adjusted upon it. Its operation is to clean snow from railway tracks by scattering it in a pulverized or fine and loose condition. The reader will be interested in following the annexed detailed description of this important invention, which is easily done with the assistance of the cuts.

The letters F′ F′ designate the horizontal bars of the frame, and G′ G′ the uprights. The frame is designed to be supported upon suitable wheels, to enable it to be moved readily along the track.

A designates a large metallic drum flanged at each side, and having between the flanges the transverse cutters or scrapers *a a*, of curved shape, arranged somewhat like the

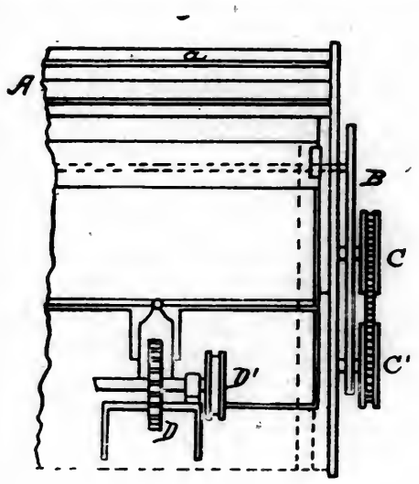


FIG. 3.

buckets of a water-wheel. The wheel or drum is also provided with circumferential intermediate flanges, *c*, subdividing the pockets *d*. Around the outside frame-work of the wheel is arranged a shell or casing, *b*, preferably of boiler iron. The buckets or pockets *d d* of the wheel form receptacles for the snow taken up by the cutters. The drum A is supported by the arms B B, which extend from the main frame. At the ends of the drum-shaft are the sprocket-wheels C and C″, driven from the sprocket-wheels C′ and C‴ by chains. On the shaft of the sprocket-wheels C′ and C‴ is secured a central sprocket-wheel, C⁗, which is driven by a chain from the sprocket-wheel D at the rear end of the machine. The wheel D and its shaft and the pulley D′ thereon are driven by an engine on a platform-car in rear of the machine.

E represents a shield or apron at the front end of the machine, between the frame and the drum A. Starting from a point near the track, this apron extends upward around the rear of the drum to the point or nose of the deflector R, and then is bent back at a sharp angle. It is designed to act as a guard to keep the snow from getting into the machine. The deflector R is of angular form, having two lateral wings, R′ R′, which extend rearwardly and outwardly, and are curved in concave form from above and below on their outer sides. It is arranged in elevated position back of the upper portion of the drum, and is designed to scatter the snow laterally, as it is thrown against the deflecting sides thereof by the action of the drum. The deflector is supported on the longitudinal C-shaped rails *h h*, which are secured to the upper portions of the sides of the frame. The deflector is provided with friction-wheels *s s′*, whereof the wheels *s s* run on the top of the track-rails *h h*, and the wheels *s′ s′* run under the flanges thereof. The sides P of the car are hinged at their upper edges, as at *p p*, to open outward at the bottom. The car is provided with a falling bottom consisting of two portions, L L′, hinged centrally to a support, as at *m m*, so that the bottom sections open by falling downward and inward at their outer portions. The cen-

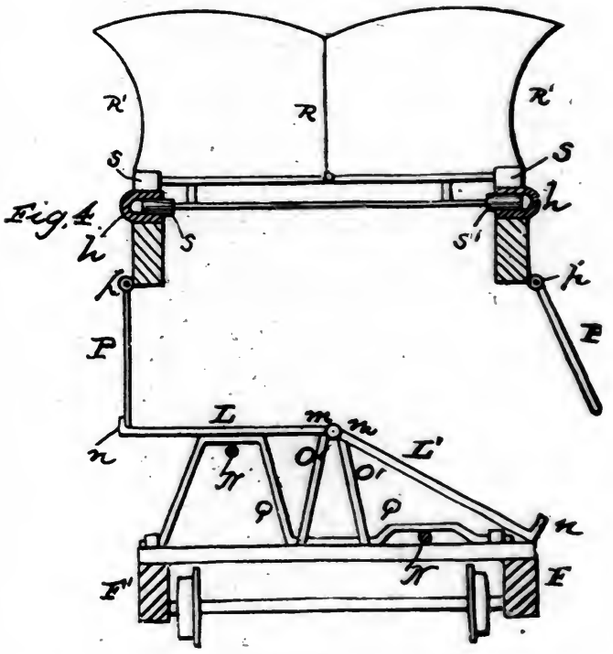


FIG. 4.

ter standards, O′ O′, to which the bottom sections are hinged, are made centrally open, to provide for the passage of the long central operating chain. The outer edges of the bottom sections, L L′, are provided with catch-lugs or upwardly-turned ears *n*, which are designed to engage the lower edges of the hinged sides P, and serve to hold them securely in position when the bottom sections are raised in horizontal position. The bottom sections are held in horizontal position by means of crank shafts Q Q and longitudinal rods N N, connected to a chain or chains and mechanicism attached to the operative parts of the engine. These devices are controlled by means of a lever. When the tension on the crank shafts is relieved, these supports fall into horizontal position, and the bottom sections are allowed to drop at each side, releasing the hinged sides P, so that they can swing outward, if necessary.

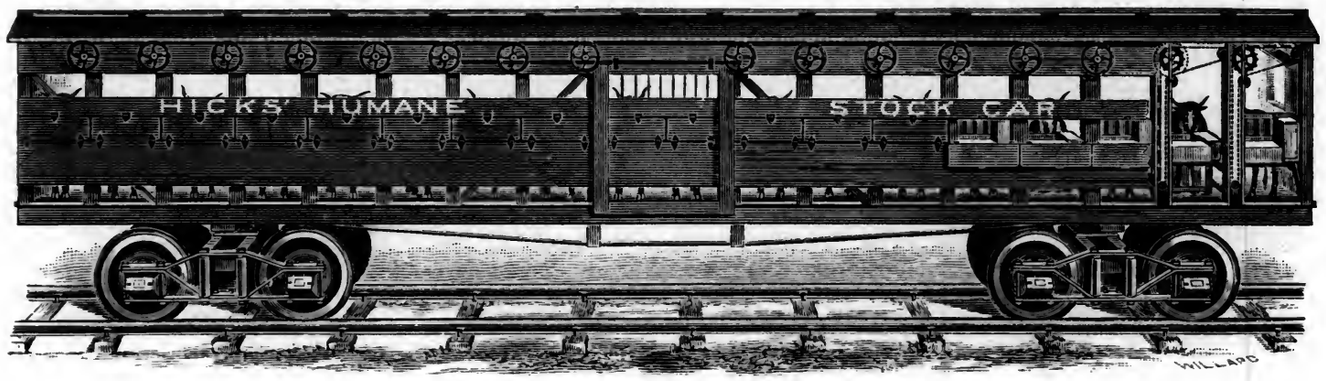
A lever *l* pivoted to the frame at *f*, is used to hold the deflector R securely to the track. The lever is held in its position by means of a ratchet and spring-catch.

At the end of the car is arranged a pair of upright posts, U which support at their upper ends a pulley W, over which runs a chain Z, which is attached to the end

of the track at *y*. This rear end portion of the track is hinged to the main track *h* at *t*, and is designed to be turned downward when the deflector is moved to the rear thereon, so that said deflector will be out of the way.

V indicates a small steel spring rail clearer, which is secured to the lower portion of the frame of the machine on each side, just over the railway rails.

The working of the machine is as follows: In order to clear the track of any ordinary drift, the machine is pushed into the bank or drift, the drum A being revolved in the direction indicated by the arrows at a high rate of speed. As the drum revolves, it cuts out the snow and throws it over backward against the deflector R with great force. The masses of snow are divided by the front angle of the deflector, and the sides of the latter cause it to be scattered to a considerable distance on each side of the track. When, however, the banks of snow at the sides of the track are so high that the snow cannot be thrown over them, then the deflector is moved to the rear of the car on the hinged portions *y* of the track rails, by which it is supported. The deflector is then turned down by lowering the end portion *y*, of the track. The bottom sections of the car are then raised in horizontal position, engaging the sides P thereof, and thereby a receptacle or box is formed, into which the snow is driven by the drum A. When the box is full, the machine is moved back to a place where there are no banks on either side of the track. Then the bottom sections of the box are allowed to fall, and the snow is discharged on either side of the track. The bottom of the car is then raised again, and the machine is pushed back into the bank for a fresh load.



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HENRY C. HICKS, East Minneapolis, Minnesota, has been occupied many years in the endeavor to devise a stock car which can be turned from a stock to a miscellaneous freight car, and again to a stock car. The invention, of which we give an illustrated description, is the result of his prolonged cogitations and numerous experiments.

He claims that it will suit the railroad men, for it can be handled quickly, and is adapted for all kinds of merchandise as well as for stock; will suit the shippers of stock, it can be so easily loaded and unloaded, watering and feeding are convenient, and rapid transit can be had, so that shrinkage will be small; and will suit the public at large, for the stock can have comfortable stalls and efficient apparatus for watering and feeding.

The stall bars are stout, light and flexible, are attached

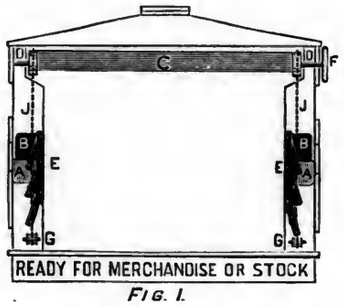


FIG. 1.

to endless chains *J*, driven by a sprocket wheel *D*, having a hand wheel *F*. This arrangement gives the endless chains *J* and stall bars *C* a positive motion; so that if in loading the stock, they are close together, the stall bars can be forced down or up between each one as desired. The arrangement for feeding and watering is simple in construction and efficient in its work. Water cup *B* and water tank *A* are so made that when the stock drinks water cup *B* dry, it empties water tank *A*, then to fold up water cup *B* it empties the cup and tank as in *Fig 1*. The mangers or feed boxes *E* can be operated from the outside of the car, also water cup. The corners of the mangers

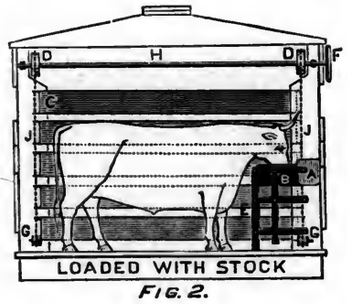


FIG. 2.

will be made from angle iron, so that the front and sides can be riveted or bolted to them. Mangers can be made open at sides and front or tight, with or without bottoms. The mangers are so constructed as to form a shield to the watering arrangement, either up or down. All of the mechanism is operated from the outside of car, so that wild stock can be as readily handled as domestic. When the car is to be loaded the central door is opened

as in an ordinary car; the door is then closed. The mangers water cups, and stalls are put in position at the loader's time and pleasure. To unload, the mangers are drawn in, the stalls raised, the central door opened, and the stock driven out. The inventor's patents are dated April 19th, 1881, June 11th, 1883, July 10th, 1883, and Nov. 13th, 1883.

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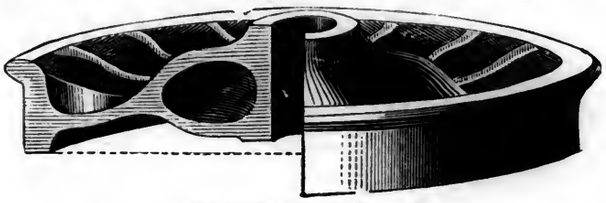
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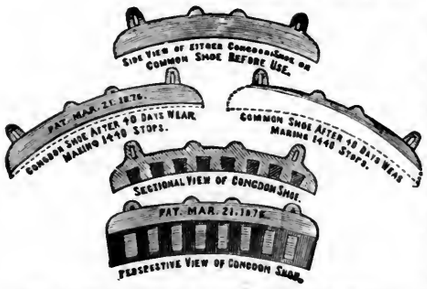
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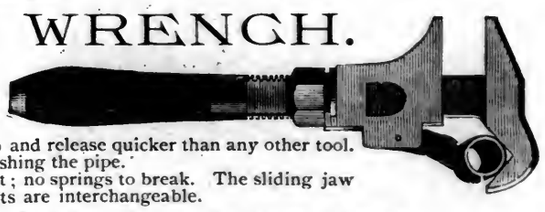


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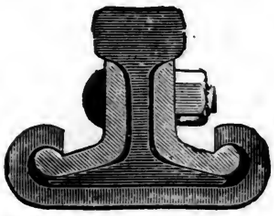
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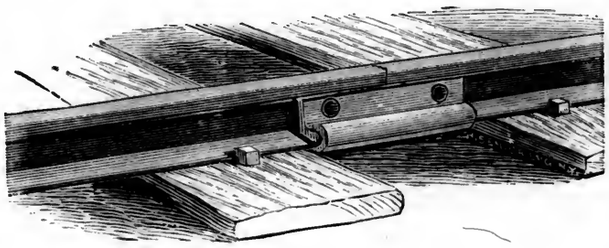
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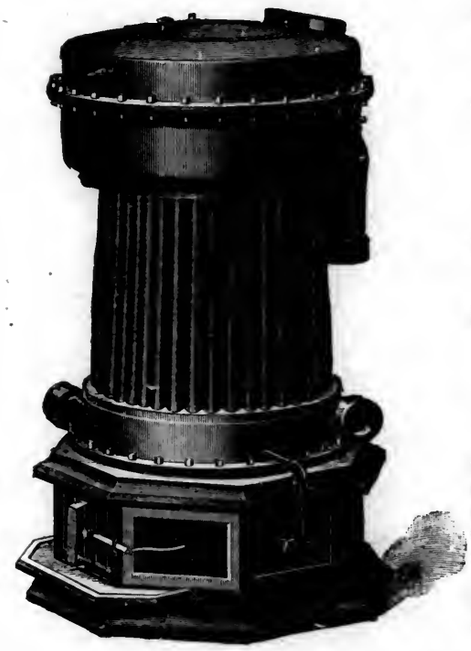
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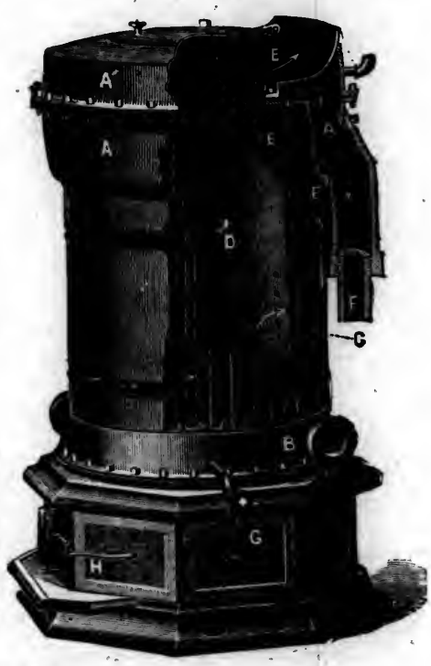
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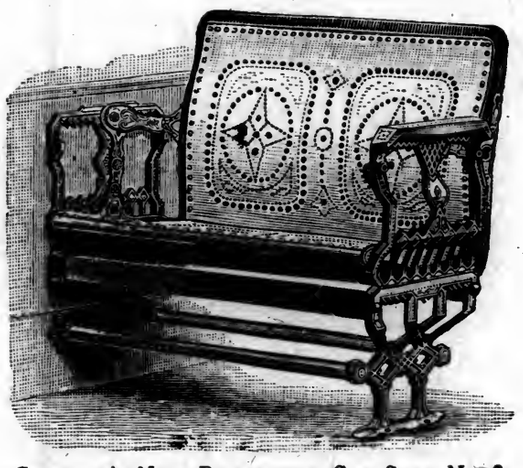
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Made with Perforated Veneer, Leather, Plush, and Rattan Seats, which are interchangeable: one kind of seat can be used in the Summer, and the other in the Winter.

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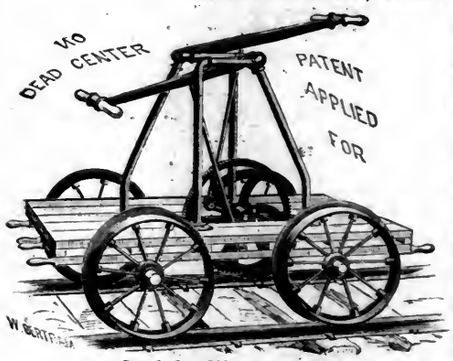
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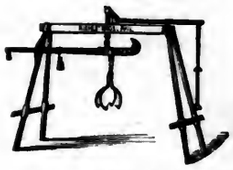
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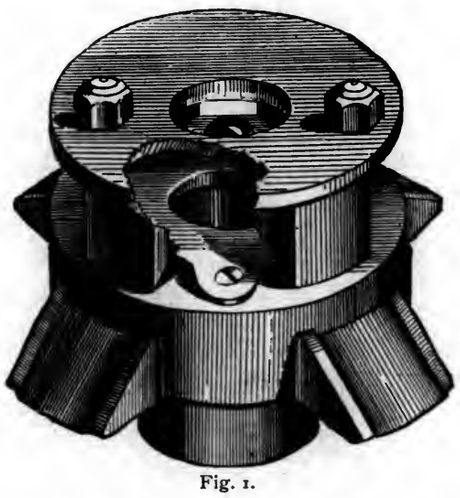


Fig. 1.

This device is highly recommended for trial upon any **Locomotive** where speed is the principal object in view. Absolute freedom from friction, and a perfect joint, at the stuffing box; and no delays from blowing out *the stuffing*. Do not fail to try the new Patent.

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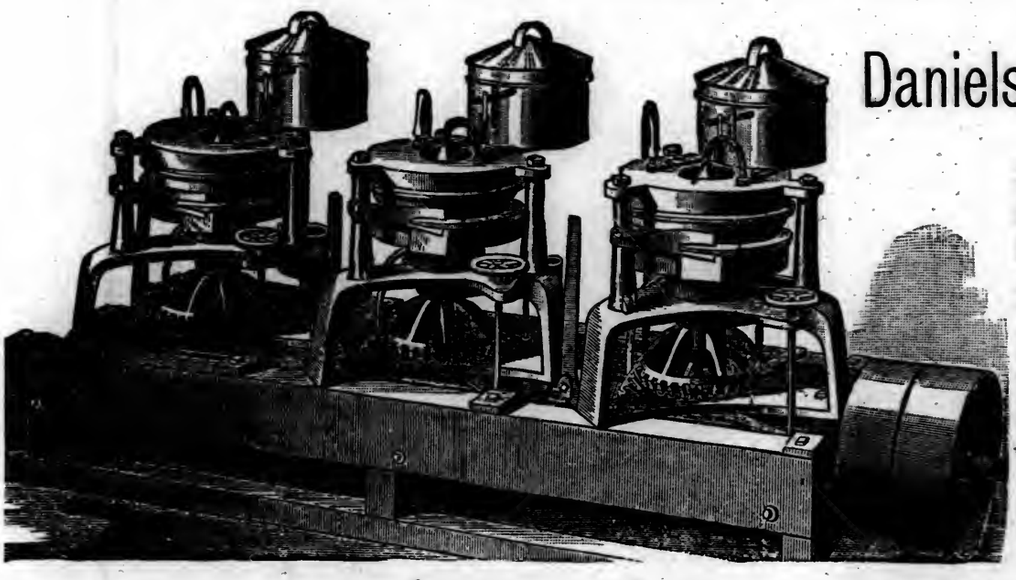
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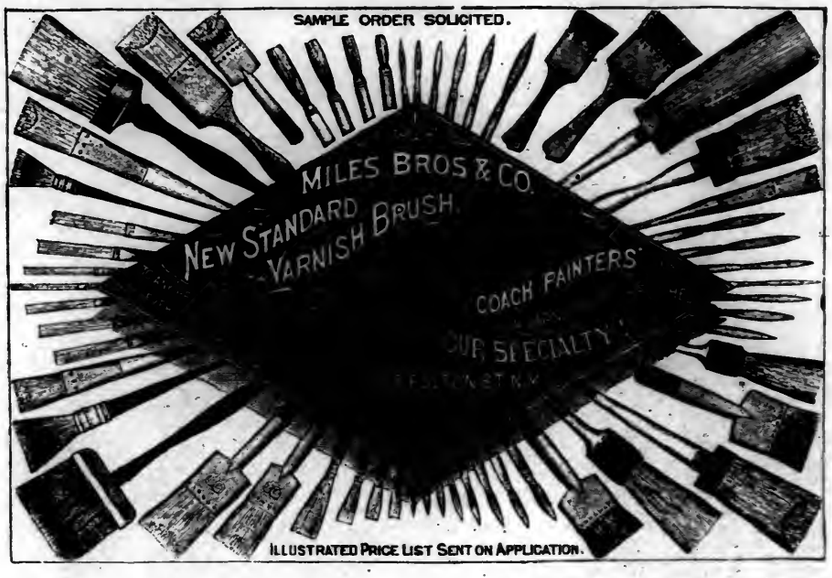
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The cut represents three mills on one bench, all driven by one belt; the stones are cooled with water expressly for grinding Coach Colors in Japan and Varnishes. The larger sizes are especially adapted for grinding car and all fine oil colors.

These Mills are now in use by nearly all the large manufacturers in the United States and Canada.

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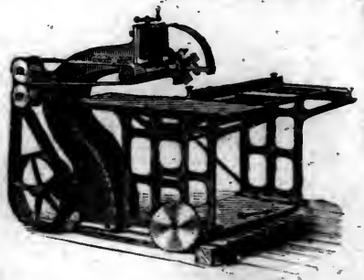
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BROOKLYN.

Beats all machines. My new goods are guaranteed unrivaled in speed, durability, and ease of sharpening. A six-foot Cross-Cut Saw, with combined file and set and two Patent Handles, will be sent to any address upon receipt of Four Dollars. The universal Pat. sheathed, Pruning and Hand Saw, inclosed in brass-edged sheath, mailed on receipt of One Dollar. A Buck Saw blade will be inclosed with the Cross-Cut for fifty cents additional. By using my patent file a Cross-Cut may be sharpened at a cost of five cents, and a Buck Saw for five cents. Send for illustrated price list.

I make a liberal discount to honest dealers, and will protect them.

I have obtained decree, with costs and damages, against all parties who imitate my **M** teeth which cut with the outside of the **M** only. The two points of each tooth are set upon one side and the next two points on the other side, equivalent to front cut of ordinary hand-saw tooth, both ways, one point alternate decreases cutting one-half, as do all imitations (which are still held liable by the United States Court), and new Company will now collect of dealers and users, as well as manufacturers, for infringements. An Illustrated Catalogue furnished free on application.

For One Dollar, a Pruning Saw, complete, with brass edge sheath, or a Buck Saw blade, will be mailed. Agents wanted, to whom special terms will be made, and who can do well. This Company also manufactures the **Noon-day Stove Polish,** so rapidly coming into favor.

AMERICAN Railroad Journal

·ESTABLISHED·1831·

WHOLE NO. 2,548.] NEW YORK, JANUARY, 1884. [VOLUME LVII.—NO. 10.

Railroad Notes.

WE invite railroad officers to send us notice of elections, transfers, appointments, resignations, etc.; and all our readers would oblige us by furnishing us with any items of news which may come to their knowledge and are of a suitable nature for our columns. It is our intention to publish monthly full and accurate information regarding those enterprises and industries to which the AMERICAN RAILROAD JOURNAL is devoted, and to effect this end we solicit the coöperation of readers interested therein. We aim specially to record all new railway enterprises in the United States and Canada, and to note the progress of construction on all new roads and extensions; and we request those concerned in railway building to give us early information concerning the above, that our reports may be as complete as possible.

FINANCIAL AND STATISTICAL.

THE following railroad reports for the year ending September 30, 1883, have been filed with the New York Railroad Commissioner:

NEW YORK, WEST SHORE AND BUFFALO.

Capital stock		$40,000,000
Capital subscribed and paid in		35,455,400
Funded debt		43,036,000
Unfunded debt		
Construction and equipment		78,612,945
Earnings:		
Passengers	$76,725	
Freight	11,493	
Rents	250,000	
Express	3,387	
Miscellaneous	6,005	$347,610
Charges for transportation	$98,457	
State taxes	8	
Interest on bonds	250,000	$348,461
Deficiency for year		$855

Passengers carried, 136,646; tons of freight, 10,951; persons killed, 9; injured, 4.

NEW YORK, ONTARIO AND WESTERN.

Capital stock		$65,000,000
Capital stock paid in and issued		60,113,983
Unfunded debt		2,311,899
Total cost of road and equipment		52,856,017
Total earnings	$1,357,777	
Charges against earnings	1,434,428	
Deficiency for the year	$76,651	

Passengers carried, 546,803; tons of freight moved, 562,836; persons killed, 15; injured, 43.

The Fall Brook Coal Company, operated and reported by the Corning, Cowansque and Antrim Railroad Company: Earnings, $650,829; disbursements, $677,678; deficiency, $26,848.

The Hartford, Connecticut and Western Railroad Company: Earnings, $394,411; disbursements, $384,582; surplus, $9,829.

The Ogdensburg and Lake Champlain Railroad Company: Earnings, $638,277; disbursements, $628,642; surplus, $9,635.

DIVIDENDS have been declared as follows: Lake Shore and Michigan Southern, two per cent., (quarterly); Canada Southern, two per cent. (semi-annual), and Michigan Central, three per cent., (semi-annual). These are payable on the first of February. The Lake Shore and Michigan Southern Company reports gross earnings of $18,550,000, an increase of $324,361 over 1882. Operating expenses and taxes, amounting to $10,975,000, show a decrease of $82,807 over last year, the net earnings being $7,575,000, an increase of $407,168, and the percentage of earnings 59.17. For interest, rentals, and dividends on guaranteed stock was paid $3,550,000, leaving a balance of $4,025,000, or $8.14 per share. From this $3,957,320 was paid for dividends, leaving a surplus of $67,680, which is $115,832 less than the surplus of last year. The gross earnings of the Michigan Central and Canada Southern, were $14,000,000, of which $4,300,000 were net earnings. The operating expenses were 69.28 per cent. of the gross earnings, or $9,700,000. There was paid for interest and rentals $2,475,000, leaving a balance of $1,825,000. Of this the Michigan Central received $1,216.667, and the Canada Southern $608,333. This in the case of the former amounted to $6.49 per share, and in the latter $4.05. After the payment of dividends the Michigan Central had a surplus of $92,375, and the Canada Southern one of $8,333.

AT the recent annual meeting of the stockholders of the Richmond and Danville Railroad Company, held at Richmond, Virginia, on December 12, president A. S. Buford's report showed the earnings from all sources to be $3,805,791, and the expenses of maintenance and operations $2,218,853, leaving the net earnings $1,586,937. The total net revenue for the year was shown to be $1,605,256. The total interest on the funded and floating debt, including interest on debentures and rentals of leased lines for the year, was $1,492,700, which gives a balance of net revenue over all charges of $112,556. The increase in the gross earnings over those of last year was $154,718, and the decrease in operating expenses $134,184, showing an increase in net earnings over last year of $288,902. The total indebtedness of the company was stated, in round numbers, at nearly $10,000,000, against which was to be credited in valuable properties over $6,000,000.

THE New York, West Shore and Buffalo Railroad Company has applied to the New York Stock Exchange for the quotation of $14,750,000 of its first mortgage bonds, not now listed, the quotation to include such registered certificates as coupon bonds may be converted into. The $14,750,000 is the remainder of the issue of $50,000,000 of five per cent. bonds. Application has been made by the Gulf, Colorado and Santa Fé Railroad Company to have $384,000 of its first mortgage bonds listed by the Stock Exchange. These bonds have been issued in payment of thirty-two miles of road which has been completed at a cost of $12,000 a mile.

THE gross earnings of the New York Central and Hudson River Railroad, for the year ending September 30, 1883, were $33,770,721.82, the largest in its history. They exceed the gross earnings of 1882 by $3,141,940.44. The total expenses for the year were $20,750,594.03, the net earnings being therefore $13,920,127.79. The stock and debt of the company, as compared with last year, is given as follows:

	1882.	1883.
Capital stock	$89,428,300 00	$89,428,300 00
Funded debt	48,473,033 33	49,997,233 33
Unfunded debt	5,254,369 93	4,689,242 71
Total funded and unfunded debt	53,727,403 26	54,686,476 04

THE earnings of the Oregon Improvement Company, owning and operating the Pacific Coast Steamship Company, the Pacific Coast Railway Company, the Columbia and Puget Sound Railway Company, and the Seattle Coal and Transportation Company for the fiscal year ending Nov. 30, 1883, were: December 1, 1882, to October 31, 1883, gross $3,705,109, net $1,194,124; November, 1883, gross $384,247, net $152,738; total, gross $4,089,356, net $1,346,862; total 1882, gross $3,361,277, net $1,095,664; November, 1882, gross $340,058, net $90,554.

THE stockholders of the Buffalo, New York and Philadelphia Railroad Company have approved a proposition of the board of directors to increase the funded indebtedness of the company to the total authorized issue of $25,000,000. The original issue of bonds was $21,000,000, and subsequently $1,700,000 were sold for new cars and engines, stations, sidings, and advances to develop coal properties. The increase recently authorized is $2,000,000, which is to be devoted to additional equipment and facilities demanded by the growing business of the road.

THE annual report of the Massachusetts Railroad Commissioners was submitted to the legislature, January 7. During the year ending Sept. 30, 1883, there were 3,798 additional miles of railroad constructed in this State. The aggregate capital stock was $122,367,572. The net debt of the companies amounts to $72,933,290. The total gross income for the year was $43,380,387; total expenses, $32,479,907. The local passenger earnings were $13,652,320; through passenger earnings, $5,245,265. The total number of passengers carried was 61,530,747. The whole number of tons of freight carried was 20,202,881.

BY a decision of the Supreme Court of Pennsylvania, in the case of the City of Pittsburgh against the Pennsylvania Railroad, the Pennsylvania Company, and various railway corporations, the city recovers $263,000 delinquent taxes. The property which has thus been decided subject to taxation will hereafter yield an annual revenue to the city, of $90,000. The amount due from the Pennsylvania Railroad Company is $177,000.

THE annual report of the Long Island Railroad shows that the total earnings were $2,685,090, and the transportation expenditures $1,683,814.33. During the year the road was greatly improved. The sum of $368,770.13 was expended for new rolling stock. The total amount expended for improvements was $983,924.18. During the past two years the improvements cost $2,675,525.96.

THE gross earnings of the Northern Central Railway Company for November were $536,094; expenses, $370,387, and net earnings, $165,707, being an increase, as compared with November, 1882, of $17,576. The net earnings for the eleven months of 1883 were $2,237,145, being a gain, as compared with the corresponding period of 1882, of $307,980.

THE statement of coal tonnage of the Philadelphia and Reading Railroad Company for the fiscal year ending Nov. 30, gives the total as 11,449,373 tons, an increase of 3,019,547 tons compared with the previous years. About $4,500,000 of the $5,000,000 of the Lehigh Coal and Navigation Companies' first mortgage loan had been extended by the middle of December.

RAILWAY foreclosures in 1883 covered eighteen lines, 1,354 miles of track, $18,825,000 capital stock, and approximately, $28,505,000 bond and debt. The total capital invested (stock, bonds, and debt) was $47,330,000, against $65,426,000 on foreclosed roads in 1882, $127,823,000 in 1881, and $263,882,000 in 1880.

THE board of directors of the Lehigh Valley Railroad Company has increased the capital stock of the company outstanding twenty per cent., giving stockholders the privilege of subscribing to the new stock at par in the proportion of one share for five held by them. This increase of capital amounts to $5,526,639.

THE directors of the Oregon Railway and Navigation Company have voted to reduce the annual dividend for 1884 from ten to eight per cent. The first quarterly dividend of two per cent. has been officially declared, and will be paid Feb. 1.

THE Federal government has agreed to pay the government of Nova Scotia $1,200,000 for the Eastern Extension Railway, running from New Glasgow to Canso, the local government to relinquish its claim to the Pictou branch.

THE aggregate earnings of the Chicago, Milwaukee and St. Paul Railroad for the year ending Dec. 31, 1883, were $23,660,000, against $20,385,000 for 1882, an increase of $3,275,000. The earnings for 1881 were $17,025,461.66.

AT the annual meeting of the Virginia Midland Railway, held at Alexandria on the nineteenth of December, president Barbour reported the gross earnings for the year to have been $1,664,304; operating expenses, $956,194.

THE annual report of the Boston, Hoosac Tunnel and Western Railroad shows the total earnings for the past fiscal year to be $368,245.40; disbursements (for transportation expenses), $388,922.98; deficiency, $21,637.88.

DURING the last year 6,600 miles of new track were laid in the United States, costing about $165,000,000. There are about 120,000 miles of track in the United States. In 1882, 11,600 miles were laid, and 9,800 in 1881.

THE Pennsylvania Railroad Company has purchased the

Eastern Shore Railroad at a price approximating $450,000. The Eastern Shore Road runs from Delmar, Del., to Crisfield, Md., a distance of thirty-eight miles.

THE earnings of the Union Pacific Railway for the eleven months ended Nov. 30, 1883, were $27,353,779—a decrease of $451,242. The expenses were $14,939,282—an increase of $242,554.

THE directors of the Bald Eagle Valley Railroad Company have declared the regular semi-annual dividend of four per cent., and an extra dividend of one per cent., payable on February 1.

THE Nantasket Beach Railroad was sold at auction in Boston on the seventh of January, for one hundred thousand dollars, to satisfy the claims of its bondholders.

THE Trunk Line Commissioner, Mr. Fink, has made the reduction of east bound freight rates on grain from thirty cents to twenty cents per one hundred pounds.

THE officers of the Oregon Transcontinental Company have made an arrangement for a loan of $8,000,000 with which to wipe out its floating debt.

THE Central Pacific Railroad Company has declared a semi-annual dividend of three per cent., payable Feb. 1.

ELECTIONS.

AT the annual meeting of the stockholders of the Baltimore and Philadelphia Railroad Company held at Washington, on December 11, the following board of directors was chosen; James B. Washington and William S. Bissell, of Allegheny City; Thomas W. King and Harry S. Burgesser, of Pittsburg; Robert Garrett, of Baltimore, and William M. Canby, William Canby, and Victor Dupont, of Wilmington. The directors elected James B. Washington, president; Robert Garrett, vice-president; John C. Farrar, secretary, and William H. Ijams, treasurer.

THE following are the directors of the Pittsburg and Connellsville Railroad: Robert Garrett, Mendes Cohen, Hugh Sisson, and Charles Webb, of Baltimore; W. S. Bissell, John D. Scully, George A. Berry, and C. S. Fitzhugh, of Pittsburg: William Baldwin, of Connellsville, Pennsylvania; W. H. Markle, of Greensburg, Pennsylvania; W. H. Koontz, of Somerset, Pennsylvania, and C. C. Markle, of West Newton, Pennsylvania. The board was organized and Robert Garrett elected president, and J. B. Washington, secretary, treasurer and auditor.

AT the annual meeting of the stockholders of the New Haven and Northampton Railroad Company, January 2, the following directors were reëlected: Charles N. Yeamans, Westfield, Mass.; George J. Brush and Daniel Trowbridge, New Haven; Horatio G. Knight, Easthampton, Mass.; George H. Watrous, New Haven; William D. Bishop, Bridgeport; Charles M. Pond, Hartford; Ezekiel H. Trowbridge and Edward M. Reed, New Haven. Mr. Yeamans was reëlected president, and Edward A. Ray secretary and treasurer.

THE newly elected directors of the New York, West Shore and Buffalo Railroad Company, are: Horace Porter, George M. Pullman, H. Victor Newcomb, John J. McCook, Charles F. Woerishoffer, Frederick Billings, Edward D. Adams, John W. Ellis, Theodore Houston, Henry K. McKarg, Elmer L. Corthell, of New York; Peter B. McLennan, of Syracuse; John B. Kerr, of Newburgh. The retiring members of the old board were Henry Villard, Charles Lanier, Charles Paine and R. T. Wilson.

AT a meeting of the stockholders of the North River Construction Company, which is building the New York, West Shore and Buffalo Railway, the following directors were elected: Edward F. Winslow, Charles Freeman Smith, Michael P. Grace, Thomas W. Lillie, Walter Katte, Howard Mansfield and George G. Nevers, of New York; Conrad N. Jordon, of Englewood, New Jersey, and Charles Bard, of Norwich, Connecticut.

AT the annual meeting of the Norwich and Worcester Railroad Company the following were elected directors: F. H. Dewey, Edward L. Davis, Thomas B. Eaton, Samuel Woodward and Josiah H. Clark, of Worcester; John F. Slater and Lorenzo Blackstone, of Norwich; William Bayard Cutting, of New York; William G. Weld, of Newport, and James H. Beal, of Boston. F. H. Dewey was reëlected president.

THE incorporation of the Lake Erie and Mississippi Railway Company was effected at Springfield, Illinois, on the seventh of January, with Columbus B. Cummings, George A. Ives, John B. Cohoes, and Luther M. Dearborn as incorporators, and who constitute the first board of directors. The company is formed to construct a road from Bloomington to Peoria, Ill., and thence westward to the Mississippi.

THE stockholders of the New York, New Haven and Hartford Railroad Company, have reëlected the old board of directors as follows: George H. Watrous, E. M. Reed, William D. Bishop, Wilson G. Hunt, George N. Miller, A. R. Van Nest, Henry C. Robinson, E. H. Trowbridge, Nathaniel Wheeler, C. M. Pond, Augustus Schell, William H. Vanderbilt, Charles P. Clark.

AT the annual meeting of the Wheeling and Lake Erie Railroad Company held at Toledo, 74,000 shares were represented. N. H. Swayne, of Toledo, Melvin C. Day and Arthur Levy, of New York, and W. L. Sutherland, of Ohio, were elected to fill vacancies in the board of directors.

AT the annual meeting of the stockholders of the Columbus, Hocking Valley and Toledo Railroad, the old board of directors was reëlected, with the exception of J. W. Ellis, of New York, resigned, whose place was filled by J. H. Wade, of Cleveland. The board reëlected the old officers.

PERSONAL.

AT the meeting of the directors of the Baltimore and Ohio Railroad Company on December 12, after the unanimous election of Mr. John W. Garrett, as president of the road for the twenty-sixth consecutive term, that gentleman made a brief address, in which he said: "when I became your executive in 1858 the length of the roads under your control was but 514 miles, and their cost $32,000,000. Now the properties owned and controlled by the Baltimore and Ohio Company aggregate 1,995 miles and cost more than $134,000,000. When the Baltimore and Ohio Railroad was incorporated in 1827, the then novel and stupendous enterprise was undertaken by our great pre-

decessors, of building a railway to unite the waters of the Chesapeake with those of the Ohio, it being then believed that the whole capital required to construct and equip the line would be but $3,000,000, and that sum was fixed in the charter for this work. At the close of the first fiscal year of the present administration, the 30th of September, 1859, the aggregate revenues were $4,301,009.27; for the past fiscal year they have been nearly $20,000,000.

J. D. LAYNG has been appointed general manager of the New York, West Shore and Buffalo, and New York, Ontario and Western Railway companies, and the Wallkill Valley Railroad Company, in consequence of the resignation of Charles Paine, necessitated by his ill-health. Mr. Layng's appointment dates from January 1.

JUDGE GEORGE W. MCCRARY, of the Eighth United States Judicial Circuit, has forwarded his resignation to the president to take effect March 1. He has contracted with the Atchison, Topeka & Santa Fé Railroad, to fill the position of general counselor for five years, with headquarters at Kansas City.

C. C. LAMBERT has been appointed General Western passenger agent of the New York, West Shore and Buffalo Railway, with headquarters at Chicago. Mr. Lambert heretofore represented the Troy and Boston and Fitchburg Railroads in a similar capacity.

TICKET-AGENT A. D. Sheldon, of the "Big J." road has resigned the position, after twenty years of service.

PRESIDENT GOWEN, president of the Philadelphia and Reading Company, will go to Europe shortly.

CONSTRUCTION.

ARTICLES of agreement have been filed in the State Department for the merging of the Seaboard, Pittsburgh and Great Western Railroad Company, and the Delaware, Water Gap and Southwestern Railroad Company. The line of the former company extends from Greene Village, Franklin county, to a point in Allegheny county, west of Pittsburgh, a distance of 210 miles, and the latter from a point in Bedford county to Smithfield, Monroe county, near Delaware Water Gap, a distance of 255 miles. The name of the new company will be the Seaboard, Pennsylvania and Western Railroad Company, with the main office in Philadelphia. Its officers will be Robert M. Janney, of Philadelphia, president; S. E. Heasley, of Brooklyn, treasurer; C. M. Stabler, of Springfield, N. J., secretary. The capital of the company is $11,500,000.

THE Harlem River Railroad Company has filed its plans with the secretary of state at Albany and the register of New York. It has a capital of $2,000,000, and proposes to build a line of road extending from Woodlawn, the junction of the New York, New Haven and Hartford and the Harlem Railroads, to a point on the Harlem River at the northern end of High Bridge, connecting with the New York Central, the New York City and Northern, and the elevated roads at the Third and Eighth avenue bridges. The company has acquired ample dock and tunnel facilities where it can easily handle heavy freights. The officers are: John H. Cheever, president; William Ryder, vice-president; C. A. Cheever, secretary, and G. E. Harding, chief engineer.

THE Mayor of Chicago has, in accordance with an order of the city council made a year or more ago, completed negotiations for the sale to the Illinois Central and Michigan Central Roads, all that portion of the lake front between Randolph and Monroe streets east of the east line of Michigan avenue, and to within one inch of the lake shore, with the provision that this inch be leased at a nominal sum to the roads for 999 years, with the privilege of renewal, for $800,000.

PRESIDENT George Stephen of the Canadian Pacific says there will soon remain to be constructed of its 2,906 miles of main line only two gaps, one less than three hundred miles on the Pacific side of the Rocky Mountains, and one of four hundred and thirty miles north of the lakes. It is expected that both of these will be filled in the next two years, and that the needful will be forthcoming.

A NEW railroad was organized in Minneapolis, to be known as the Lake Traverse, Sanborn and Carrington Railroad. It will run from the northern end of Lake Traverse, on the boundary line between Minnesota and Dakota, northwest, crossing the Northern Pacific Railroad at Sanborn, and reaching Carrington, in Foster county, Dakota, a distance of 175 miles.

THE New York Central and Hudson River Railroad Company has agreed to transfer Wagner cars between Troy and Albany, for the Troy and Boston Railroad. The latter road proposes to run Wagner cars through between Albany and Boston, and is only awaiting the action of the Fitchburg Road with reference to taking the cars before beginning operations.

A CHARTER has been granted to the Pittsburgh and Allegheny Central Railroad, with a capital of $1,200,000, to run from Chartier's Creek, Allegheny county, to a point near New Salem, Westmoreland county, a distance of forty miles. James S. Negley is the president, and the main office will be in Pittsburgh.

THE proposed Thames River bridge will cross the river at Winthrop's Neck, and its eastern terminus will be just north of the village of Groton. The consolidated railroad —the New York, New Haven and Hartford, and the Stonington and Providence Company—is reported to be actively forwarding the enterprise.

THE twenty-year-old lease of the Pullman Palace Car Company to the Pennsylvania Railroad Company will expire shortly, and in view of this fact the latter company is making arrangements to construct elegant cars at Altoona for its own use.

THE Philadelphia and Reading Railroad Company has put engineers to work surveying lines within the borough limits of Pottsville, for a connecting line between the main line at that place and the Schuylkill Valley Road at Palo Alto.

CONTRACTORS are at work on the extension of the Hempfield, Baltimore and Ohio Railroad between Washington and Connellsville.

PEOPLE on Manhattan Island living north of 135th street are agitating for rapid transit to and from the lower part of New York city.

IT has been decided not to begin work on the Pennsylvania, Slatington and New England Railroad until the opening of spring.

MISCELLANEOUS.

THE North River Construction Company, which built the New York, West Shore and Buffalo Railway, was put in the hands of a receiver on the twelfth of January, on the application of Valentine L. Lary, the president of the New Jersey and New York Railroad, who is a member of the firm of Ward, Mackin & Co., contractors for work on the road. Chancellor Runyon, of Newark, New Jersey, appointed Judge Ashbel Green, of Tenafly, a member of the law firm of Alexander & Green, of New York, the receiver. The Construction Company was incorporated under the laws of New Jersey in January, 1881. Its capital of $500,000 was increased to $10,000,000, all paid in, when it began work on the West Shore Road, the following March.

COMMISSIONER FINK, by authority of the railroads he represents, has informed Samuel Sloan, president of the Delaware, Lackawanna and Western, that unless the road maintains the pool rates and stops making time contracts at reduced rates and within a certain period, the roads west of Buffalo will stop receiving or delivering through freight to it. This would prevent the Lackawanna from issuing through bills of lading or sending through cars beyond its own line. It would have to break bulk at Buffalo. Besides, it would have to pay local rates for freight sent by it over connecting lines. The specific charge made against the Lackawanna is that it gave a discount of twenty per cent. on its freight bills to shippers.

MAYOR LOW, Brooklyn, has signed the resolutions of the Board of Aldermen giving to the Kings County Elevated Railroad Company the authority to commence proceedings for the erection of their proposed lines. The street car provisions are wofully deficient in the city across the East River.

JUDGE BLANDIN, of the Common Pleas Court, Cleveland, Ohio, has granted a perpetual injunction, asked by Scofield, Shumer & Teagle, against the Lake Shore and Michigan Southern Road, preventing the defendants making a discrimination in freights in favor of the Standard Oil Company.

THE appointment of a receiver of the New York and New England Railroad was a prominent event of the new year. At a meeting of the directors held in Boston on January 7, it was decided that the receivership be continued in force, to be terminated within four months from that date.

THE Chicago, Burlington and Quincy Railroad Company has declined to enter into the new Western railway alliance on the terms accepted by the four other Iowa roads. The proposition advanced to it was that it should join the new pool on the same terms as the Northwestern.

A SUIT is in progress in Judge Depue's court at Newark, New Jersey, involving the title to a large patch of the shore front at Communipaw. The parties are the West Line Railroad Company and the New Jersey Centrail.

THE oil trains over the Lehigh Valley are controlled by the Green Line Freight Company, and amount to 175 cars per day. The cars are delivered to the Pennsylvania Railroad Company at Metuchen.

THE Reading Railroad Company has given an order to the Baldwin Locomotive Works for thirty engines of various kinds, to be completed in the coming spring.

THE Nickel Plate fast through freight line on the New York, Chicago and St. Louis, began operations January 1. Charles Tappen, Rochester, is general manager.

THE Carlisle Car Works are building a lot of freight cars for the Cumberland Valley Railroad of forty thousand pounds capacity each.

THE Northern Central Railway Company has ordered the construction of one thousand coal cars, to be used in the Shamokin region.

The New York Elevated Railroads.

THE following are the reports for the year ended September 30, 1883:

MANHATTAN ELEVATED RAILROAD.

	1882.	1883.
Capital stock	$26,000,000	$26,000,000
Subscribed and paid in	19,005,700	19,150,700
Unfunded debt	1,596,302	1,134,617

Earnings:

Passengers	$6,345,258
Mails	5,000
News privileges	9,000
Interest	4,642
Sale of old scrap, etc	22,604
Total	$6,386,505

Expenditures:

Transportation	$3,756,827
Dividends	390,000
Rental of leased lines	1,384,080
Total	$5,530,907
Surplus for the year	855,597
Surplus Sept. 30, 1882	362,458
Passengers carried	92,124,943

	1882.	1883.
Capital	$10,000,000	$10,000,000
Subscribed and paid in	6,500,000	6,500,000
Funded debt	8,500,000	8,500,000
Unfunded debt	51,336	85,463
Total cost of road and equipment	14,918,682	14,572,250

The sum of $346,432 has been taken out of construction and added to profit and loss. In addition to the sum of $14,572,250, the Manhattan Company expended upon the lines of the company to Sept. 30, $609,473, making $15,182,724; earnings from rent, $10,000; paid for legal services, $8,605; paid for miscellaneous, $1,175; surplus for year, $1,818; surplus Oct. 1, 1882, $207,981.

METROPOLITAN ELEVATED RAILROAD.

	1882.	1883.
Capital	$6,500,000	$6,500,000
Funded debt	12,818,000	12,818,000

Earnings from rents, $10,000; paid for specific purposes, including $13,181 for legal expenses, $19,159.

Vandalia Railroad Company.

THE gross earnings of the Vandalia Railroad Company for the year 1883, are $1,700,954; the expenses, $1,306,067; the net earnings, $394,887. The rental from the lessees is $510,286; from which deduct the interest on the bonds, $314,930, and the amount paid for taxes, etc., $42,981, which leaves a surplus for the year of $152,375. The expense account includes $115,634 for betterments. The following are the newly-elected directors: Thomas D. Messler, William Shaw, John N. McCullough, W. R. McKeen, R. L. DuLaney, Abraham McNeill, A. G. Henry, Charles H. Seybt, and J. S. Peers. The board elected Thomas D. Messler, president; John E. Davidson, treasurer, and Williamson Plant, secretary.

CHINA has only seven miles of railroad.

AMERICAN Railroad Journal

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NEW YORK, JANUARY, 1884.

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HENRY VILLARD.

THE last time Mr. Villard's name was prominently mentioned in these columns, as far as the general public knew, he had attained prosperity and honors which promised to be abiding. It was with a shock of surprise that on the eighteenth of December last, the intelligence was received of his surrender of his great office as president of the Oregon Transcontinental Company, and of the Oregon Railway and Navigation Company. When the further announcement was made, that he had also resigned the presidency of the Northern Pacific, the prevailing feeling was sympathy for a man who had risen so high to fall so low; and this feeling was intensified by the necessity of his deeding his house to pay a debt of $340,000 to the Oregon Railway and Navigation Company. Thus broken in fortune, and as report says, shattered in health, there seems nothing to relieve the severity of his fall, except in the record of great accomplishments, in the unassailability of his good name, the not ungenerous provision voted for his financial relief by the Northern Pacific upon the occasion of its acceptance of his resignation of its presidency, and the public admiration of his ability and probity, which will assist the effect of his renewed energies when, happily, the time shall come for his resumption of great responsibilities.

A knowledge of Mr. Villard's career is possessed by every reader of this magazine. His dazzling reputation originated at the time of his being appointed the agent of European holders of the securities of transportation companies doing business in the northwest. While thus engaged he formed plans looking to the control of the transportation business concerning the vast extent of country watered by the Willamette and Columbia. The development of these plans resulted in his control of the Oregon and California Railroad Company, the Oregon Steamship Company, and the Oregon Steam Navigation Company, which interests were, under his forming hand, in the course of time, made parts of the Oregon Railway and Navigation Company, a creature of his genius for great enterprises. His master stroke, however, was the conversion of the Northern Pacific Railroad Company, from a competitor into an ally and friend of the Railway and Navigation Company. This was effected by the formation of the "blind pool" of 1881, whereby eight million dollars were raised as a purchasing fund. The Oregon and Transcontinental Company was the result of the transactions thus developed, consolidating the interests of the Northern Pacific and the Oregon companies. While carrying out these projects of colossal magnitude, Mr. Villard found time for important concerns of great but less importance; and the wonder grows how one man could accomplish so much.

Shrinkage in the values of the Villard securities wrought

the downfall of their originator. As to the immediate causes of this shrinkage, these may never be known fully, nor how far Mr. Villard is responsible for them. Possibly in this instance of the decline and fall of a brilliant man, an astuter mind than his has accomplished his downfall.

Mr. Villard's career is historic. What he accomplished is great and will prove of invaluable service to his fellow-citizens, a service which will be remembered gratefully and admiringly in the pages which record the matchless development of American commercial progress.

THE RAILWAY PROBLEM.

IN the January number of the *Princeton Review*, is an article by C. Stuart Patterson, on the above subject. We have read the article with some degree of pleasure, because from beginning to end we have noticed a disposition to be fair-minded, and to acknowledge that the railroads have some rights which must be respected.

The question of freight rates probably gives as much trouble as any other question which arises between the management of a railroad and the people; but who shall determine this question so that justice shall be meted out to both sides? As Mr. Patterson rightly states the matter: It costs a railroad more to haul freight on an up grade than on a level surface; more to pull it through a tunnel than on a long stretch of easily built road-bed. It costs a road more to carry freight for short distances than long, because the same amount of labor is necessary to load and unload in both cases, and the wear and tear of stopping and starting a train must be taken into account as well. Now these are only a few of the difficulties under which a railroad management labors in making a proper tariff for freight transportation, and we do not see how a railroad commission is to help matters unless all these items are taken into account, and a larger pro-rata given to those roads whose cost of hauling is in excess of other roads. When this is done, other evils will creep in, such as roads abandoning their connections and doing business on their own terms independent of the others. Roads which are used by large shippers will naturally break rates to retain their large customers, and with some show of justice. It is a principle well established in business that a certain discount should be made for quantity which would not be allowed for lesser amounts. A man buying a shirt does not expect to get one for less than a dollar fifty, but if he buys a dozen he expects to get them for fifteen dollars. We confess ourselves puzzled as to how an equitable tariff can be framed by a commission for all railroads, taking all these questions into account, and meting out exact justice to all. We do not think the man is born who can do it successfully.

For ourselves, we see but one solution to the railway problem, and that is to look upon the railways and to treat them the same as we do all other branches of business. We do not think of a commission for dry goods merchants, grocers, hardware men, and others. We let them cut and slash if they will, and we take advantage of their competition and buy of the one who will sell the cheapest. Some of them succeed, and some lose their money and go to the wall. So must it be with railroads. Let them cut and slash and compete with each other as much as they want. Let the stockholders lose their money. They might just as well lose it in railroad competition as in any other competition. The men who will buy stock in a railroad having no present value in hope of realizing in the future, have rightly no more fault to find if they lose, than they would have if they had bought anything else for a rise. Parties, if they chose, had a right to build the West Shore Road and give fifty millions worth of their bonds for twenty-five millions' worth of labor, in the hope that when the road was completed its business would warrant such a proceeding; but if the business does not come in and the road goes into the hands of a receiver, and the stockholders lose all, what of it? They took the risk, and if successful, would pocket the gain. Let them pocket the loss.

Just so with all railroads and everything else of a business nature. They who risk to make great gains, must also count on making great losses. It is the survival of the fittest. The only solution to the railway problem is to let the railroads alone.

THE present issue contains the first of a series of papers reviewing the earliest volumes of this journal. Dating back half a century, more or less, it is believed that the information which the compiler will dig out of these, the earliest productions in railroad periodical literature, will be found to be of a very interesting character. In the first of his articles, to which we respectfully direct the attention of readers, our contributor has pleasantly prepared the way for succeeding papers, each one of which will, of course, deal with a much wider scope of material than the first and introductory installment. We are quite sure that no person can read this without enjoying it and having an appetite for more of the same quality. Hence we assure ourselves that the fluent and graceful pen of the writer specially engaged to review the first volumes of the AMERICAN RAILROAD JOURNAL, will, by reason of this engagement, find a large and appreciative class of readers among those gentlemen the character of whose business relations gives them a particular interest in the subject of his labors.

THE New York State Board of Railroad Commissioners, sent its report to the legislature, January 14. Accompanying it was a report by Dr. Edwin Hutchinson, on

color-blindness, with the following remark: "Further than to awaken the interest of railroads and of the public on the subject, the board does not at present deem it prudent to go." Apropos of this circumstance, an enthusiastic correspondent writes us: "Truth *versus* ignorance, prejudice, and pecuniary considerations, is beginning to bear fruit."

THE excellent series of articles on Railroad Medical Service, from the pen of Dr. Herrick, has been interrupted by the serious illness of that gentleman. We are happy to learn from him that he is so far recovered as to enable us to promise, with a reasonable degree of certainty, that the next number will be enriched by another contribution from him. His many readers will share the gratification which we feel in making this announcement.

The Vanderbilt Roads.

AT a meeting of the directors of the Lake Shore and Michigan Southern Railroad Co., held at the Grand Central depot, this city, on the 26th ult., a quarterly dividend of 2 per cent. was declared payable February 1, 1884. From the report which was presented, we learn that the gross earnings for the year 1883 (December being partly estimated), were $18,550,000, the operating expenses and taxes, $10,975,000, and the net earnings, $7,575,000, from which deduct rentals and dividends on guaranteed stock, $3,550,000, leaving a balance of $4,025,000—equal to 8.14 per share—from which deduct dividends of 8 per cent. for the year, amounting to $3,957,320, leaving a surplus of $67,688. Compared with the previous year, the gross earnings show an increase of $324,361, with a decrease in operating expenses and taxes of $82,807, making the increase in net earnings $407,168. The percentage of operating expenses to earnings was 59.17 against 60.67 in 1882. In the operating expenses are included the cost of 10,000 tons steel rails and all other expenditures incident to the maintenance and improvement of the property of the company, which has been fully maintained at its best standard.

The directors of the Michigan Central Railroad Co. also met on the same day and declared a dividend of 3 per cent., payable February 1, 1884. The gross earnings of this road (including those of the Canada Southern Railway) were $14,000,000, the operating expenses and taxes $9,700,000, and the net earnings $4,300,000; from which deduct interest and rentals, $2,475,000, leaving a balance of $1,825,000, which was divided as per traffic agreement, as follows: to the Michigan Central two-thirds, or $1,216,667, equal to 6.49 per share, and to the Canada Southern one-third, or $608,333, equal to $4.05 per share.

The directors of the Canada Southern Railway Company also met and declared a dividend of 2 per cent., payable February 2, 1884.

From the portion of earnings allotted to the Michigan Central Railroad Company, two dividends of 3 per cent. each, amounting to $1,124,292, are deducted, leaving a surplus of $92,375; and from the portion allotted to the Canada Southern Railway Company, two dividends of two per cent. each, amounting to $600,000, are deducted, leaving a surplus of $8,333. The ratio of expenses to earnings of the joint roads was 69.28.

Standard Time.

A RECENT number of *Harper's Weekly* gives a portrait of Charles F. Dowd, A. M., principal of Temple Grove Seminary, Saratoga Springs, New York, the originator of the system of national time lately adopted throughout the country. On the principle, "Honor to whom honor is due," we adopt a portion of the interesting biographical matter accompanying the aforesaid portrait:

Professor Dowd began his work systematically by presenting the rude outlines of his plan before a convention of trunk lines held in New York City in October, 1869. He took his model from astronomical time reduced to the standard of one meridian. This time, in relation to any place, is local time with a difference. He adopted the Washington meridian for the national standard, and then worked out the local differences for about eight thousand stations along the lines of about five hundred railroads. Then he laid out the country into sections of fifteen degrees of longitude each, with the Washington meridian as the prime standard, and the fifteenth, the thirtieth, and the forty-fifth meridians for the subordinate standards. He then carefully wrote out a full explanation of the system, and published all, with a map, in a pamphlet of over one hundred octavo pages. This pamphlet he sent out to all railway officials and others who might be interested in the subject. This was done in 1870. After publishing his work, Professor Dowd attended conventions of railway managers in Boston, in New York, in the West, and in the South, and in this way found that the differences exceeding an hour were regarded as impracticable. This led to the adoption of the subordinate standards as essentially independent of each other, only that the even-hour differences must be preserved. This done, each hour section became a well-defined section, with its own time standard; and, with standards so near and so simply related, the necessity for any more exact local time vanished. He further found that the Washington and the fifteenth meridians were located too far west to suit the wants of the Eastern and the Central sections. Therefore, after meeting a convention at Atlanta, Georgia, in the spring of 1872, he changed the system from Washington to Greenwich longitude, thus moving all the hour sections two degrees further east. This made the seventy-fifth meridian the standard for the Eastern section, the ninetieth for the Central, the one hundred and fifth for the Mountain, and the one hundred and twentieth for the Pacific—the fifth hour eastward being the standard time of England. This is the system now in operation.

CARRIAGES on the St. Gothard Railway, are chiefly on the improved American system. The first-class carriages have an outside platform with veranda, to enable passengers to enjoy the view. All the carriages are lighted by gas, and warmed with hot air. The express trains are fitted with continuous non-automatic vacuum brakes on the Hardy system. Electrical contact instruments are provided at intervals on the line to regulate the speed of the trains.

Old Colony Railroad.

THE income of the Old Colony Railroad Company for the years ending September 30, 1882 and 1883, was as follows:

	1882.	1883.
From passengers	$2,107,749 68	$2,173,998 18
From freight	1,774,643 87	1,833,203 23
From expresses	113,880 61	108,356 62
From rents	38,060 63	38,213 32
From mails	40,023 69	38,456 92
From extra baggage	3,723 90	4,962 05
From miscellaneous	48,176 01	51,989 17
	$4,126,258 39	$4,249,179 49
Expenditures:		
Passenger department	$423,801 96	$427,747 30
Merchandise department	540,827 52	534,751 17
Locomotive department	663,437 54	725,415 29
Maintenance of way	626,707 79	703,869 78
General expense	272,301 95	302,081 48
Miscellaneous expense	139,995 32	165,213 12
	$2,680,072 08	$2,859,078 14
Net earnings	$1,446,186 31	$1,390,101 35
From which deduct—		
City and town taxes	$33,820 37	$48,508 61
State tax	106,917 37	113,151 52
Interest on bonds, debt, etc	267,709 05	371,799 74
Rent paid for use of other roads	446,407 95	191,001 57
Deficit on Union Freight Railroad	201 88	.....
Fall River Railroad lease account	3,180 00	.....
	$858,236 62	$724,461 44
Net income	$587,949 69	$665,639 91

Out of the net income of 1883, a dividend of 3½ per cent was paid January 1, 1883, amounting to $263,683; and on the 1st of July, 1883, a similar dividend of 3½ per cent was paid, amounting to $344,323—leaving a balance for the year of $57,633.91, which was credited to improvement account, and which now amounts to $91,070.78, the balance to credit of surplus account remaining the same as at the close of the previous year, viz.: $762,515.67. This surplus contains the earnings of the company since June 1, 1883, and will provide in part for the dividend of January 1, 1884, and taxes due November 1, 1883.

At the date of the consolidation of the Boston, Clinton, Fitchburg and New Bedford Railroad Company with the Old Colony Railroad Company, March 6, 1883, the shares of the latter company were made shares of the consolidated company, and one share of new stock was issued for each share of the preferred stock, and eight-nineteenths of one share for each share of the common stock of the former company—making the cost of the railroad and property $2,314,820 in stock, and $3,557,915.44 in the amount of debt assumed; increasing by these amounts the construction and property accounts of the consolidated company. It is also proper to state here that the earnings, expenses, dividends, etc., from the date of the consolidation to the close of the fiscal year include those of the Boston, Clinton, Fitchburg and New Bedford Railroad.

Compared with the year 1882, the gross earnings of 1883 show an increase of $122,921.10, with an increase in operating expenses of $179,006.06, making a decrease in the net earnings of $56,084.96.

During the year, nine new locomotives have been added in place of four old ones condemned. Ten new passenger cars and one new parlor car have been purchased or built in the shops of the company, and 232 freight and coal cars have been purchased. The cost of new equipment for the year was $226,375.86. Large expenditures were also made upon repairs of equipment. The automatic has been substituted for the common Westinghouse brake, and safety heaters have been placed, instead of stoves, in most of the passenger cars. New and efficient spark arresters have also been placed on 60 of the locomotives. The equipment now consists of 66 passenger, 39 freight and 15 switching locomotives; 233 passenger, 43 baggage, 918 box, 8 hay, 4 milk, 6 derrick, 4 scraper, 4 tool, 31 caboose, 662 platform, 38 cattle, 71 stone, 1,205 coal and 100 gravel cars.

Large contracts for steel rails were made during the year. In all 10,000 tons were purchased (though only 8,000 tons were delivered in season to be used prior to the close of the year); of these 934 tons were used for the double track, and 294 tons upon the Fall River, Warren and Providence Railroad, which has been relaid with steel rails; 6,339 tons were laid in the tracks. The tracks between Boston and South Braintree have all been relaid with new steel rails weighing 67 pounds per yard. The cost of steel rails laid in place of iron, for the year was $158,472.90. Out of 468½ miles of railroad operated by the company, about 350 miles are now in steel. The number of new sleepers laid the past year is 177,212. Nineteen new iron bridges have been substituted for wooden bridges. The Fall River Railroad, which was leased in 1882, has also been regraded and put in good order.

Since 1855, an act of the Legislature has required a stop to be made by all trains crossing another railroad at grade. As now constituted, the Old Colony Railroad has eight such crossings. In 1882, an act was passed by the Legislature dispensing with the stop, provided a system of interlocking signals, approved by the Railroad Commissioners, was adopted, under the provisions of which approved signals have been placed at two crossings, and arrangements have been made for similar signals at four other crossings. The Union Electric signals have been placed upon the main line between Boston and South Braintree, to take the place of the Hall signals, which have been removed.

The alteration of the railroad in South Boston has been completed at a cost of $48,342.31, of which $19,882.16 was expended during the past year. New station houses have been erected at Framingham, Walpole, Medfield, Pope's Hill, Cataumet, Crescent Avenue and Egypt, and freight houses at Holbrook and South Framingham. The enlargement of the Taunton Central station has also been completed. The land purchased for a new station at New Bedford has been filled up and graded at a cost of $11,215, and a new and commodious freight yard has been made at South Framingham, upon which 2,250 feet of side track have been laid, at a cost of about $20,000. A new and additional freight house, 380 by 60 feet, has been built, and its cost, so far as paid, charged to construction. The second tracks in Fall River, Attleboro and Randolph have been completed at a cost of $14,762.50. Considerable work has been done during the past year on the construction of the second track between Mayflower Park and Middleborough, and from Randolph to Fall River. The second track has been extended about nine miles to Campello, and work has been begun at several points between Randolph and Taunton. The cost of these tracks the past year, $122,767.75, has been charged to construction.

The charges to construction, equipment and land accounts for the past year are as follows: Cost of Boston, Clinton,

Fitchburg and New Bedford Railroad, $5,872,735.44; land account of do., $14,007.70; completion of Whittenton branch, $13,456.21; double tracks, $122,767.75; freight station at South Boston, $16,275.44; land in Cohasset, Taunton and Boston, $11,867.07; land and buildings in Boston on Cove and Kneeland streets, $17,023.64—total, $6,068,133.25.

Since the union of the two companies, 4,000 shares of new stock have been sold, at a premium of $146,000. The premium was credited to improvement account. The balance remaining after payment for new construction was used to reduce the debt of the company.

The improvement account for the year ending September 30, 1883, stands as follows: balance from previous year, $85,719.27; premium of stock sold, $146,000; credited from earnings, $57,633.91—a total of $289,353.18; against which are charged: filling land at South Framingham and New Bedford, $31,215; extension of second track, $14,762.50; new equipment, $152,304.90—leaving a balance September 30, 1883, of $91,070.78.

The number of miles run by passenger trains during the year was 1,575,254; by freight trains, 917,602; by gravel and other trains, 539,337—total, 3,032,193, against 2,841,907 in 1882, an increase of 190,286. The number of passengers carried the past year was 7,144,651; do. carried one mile, 104,989,238. Tons of freight carried, 1,626,509; do. carried one mile, 57,915,789.

BALANCE SHEET, SEPTEMBER 30,

	1882.	1883.
Cost of road	$11,076,275 83	$16,186,387 17
Cost of equipment	1,191,319 08	2,165,759 08
Stock of Old Colony Steamboat Co.	725,500 00	725,500 00
Bonds and stock of Fall River, Warren and Providence R. R. Co.	348,655 43	348,655 43
Stock of Nantucket and Cape Cod Steamboat Co.	15,340 83	15,340 83
Stock of Union Freight R. R. Co.	79,014 42	79,014 42
Stock of Fall River R. R. Co	.....	5,967 00
Stock of Lowell and Framingham R. R. Co.	.....	28,558 10
Stock of Oak Bluffs Land and Wharf Co.	.....	100 00
Dorchester and Milton Branch	36,937 88	36,937 88
Union Freight R. R. Co. (property account)	22,463 75	22,463 75
Land account B., C., F. and N. B. R. R. Co.	16,511 52	.....
Real estate	286,987 53	286,987 53
Cash	161,730 20	215,128 68
Materials on hand	390,443 37	408,924 77
Due from agents	148,613 40	182,056 45
Bills receivable	400,938 31	255,859 67
Debit balances	82,479 64	166,513 00
Total	$14,803,211 20	$21,130,153 76
Capital stock	$7,533,800 00	$10,222,200 00
Stock of B., C., F. and N. B. R. R., unconverted	.....	26,420 00
Bonded debt	5,324,000 00	8,886,900 00
Bills payable	738,055 95	603,643 26
Accounts payable	271,919 52	272,791 92
Dividends unpaid	21,871 41	30,436 66
Coupons unpaid	12,215 00	22,349 50
Due connecting lines	111,399 26	187,482 71
Credit balances	121,715 12	24,343 26
Improvement account	85,719 27	91,070 78
Surplus	762,515 67	762,515 67
Total, as above	$14,983,211 20	$21,130,153 76

President—CHARLES F. CHOATE.

Directors—Charles F. Choate, Frederick L. Ames, Thomas J. Borden, John S. Brayton, Samuel C. Cobb, Uriel Crocker, Francis B. Hayes, Charles L. Lovering, William J. Rotch, John J. Russell, Nathaniel Thayer, Royal W. Turner.

Treasurer—JOHN M. WASHBURN.

New York Railroad Commission.

FROM GOVERNOR CLEVELAND'S MESSAGE, JANUARY 1, 1884.

THE law passed in 1882 creating a Board of Railroad Commissioners was made operative during the last year, and the board was organized on the first day of February, 1883. During the eight months between the organization of the board and the thirtieth day of September, 1883, seventy-five complaints were preferred, all of which were fully investigated. Many recommendations have been made to the railroad companies, calculated to protect the people in life and limb, most of which have been cheerfully adopted. Of the 6,500 miles of railroad in the State, all have been inspected by some member of the board, or by a competent engineer employed for that purpose. When defects have been discovered, the company operating the road has been at once called on to remedy the same. The companies have generally evinced a desire to coöperate in every effort to secure the safety of travel. Every accident occurring in any part of the State has been reported promptly to the board. The following is the record of those killed or injured in the operation of the railroads in this State for the eight months ending Sept. 30, 1883:

Passengers	34	118
Employés	110	396
Other persons	178	146
Total	322	660

Boston and Maine Railroad.

THE receipts of the Boston and Maine Railroad Company for the years ending September 30, 1882 and 1883, were as follows:

	1882.	1883.
From passengers	$1,593,117 02	$1,679,603 22
From freight	1,079,424 90	1,134,871 66
From mails	24,489 54	24,952 67
From expresses	71,294 28	76,516 14
From rents, etc	65,715 74	69,197 41
From interest	16,688 74	6,288 65
	$2,850,730 22	$2,991,429 75
Expenses.		
Repairs of road	$167,070 80	$184,903 69
Repairs of bridges	37,700 81	49,664 41
Repairs of fences, etc	11,026 40	15,728 18
Repairs of buildings	86,762 91	102,128 72
New buildings and machinery	10,803 55	26,464 02
Repairs of locomotives	47,631 79	75,055 07
New locomotives	36,926 01	31,688 31
Repairs of cars	96,224 35	91,834 45
New cars	69,514 48	85,356 94
Fuel and water for locomotives	244,755 07	266,593 16
Oil, and waste	14,566 87	14,361 53
Renewal of ties	51,778 51	37,907 64
Renewal of rails	57,689 18	77,362 57
Insurance	6,600 00	7,215 98
Taxes	133,492 43	115,264 38
Salaries general officers and clerks	49,282 48	55,409 96
Legal expenses	13,731 47	9,151 15
Stationery and printing	18,077 40	16,260 71
Outside agencies and advertising	18,286 79	18,701 64
Contingencies and miscellaneous	12,861 16	9,694 87
Dover and Winnipiseogee Railroad rent	29,000 00	29,000 00
West Amesbury Railroad rent	5,700 00	5,700 00
Lowell and Andover Railroad rent	52,500 00	52,500 00
Kennebunk and Kennebunkport Railroad rent	.....	1,096 87
Locomotive service	124,517 92	128,385 82
Passenger train service	66,580 78	75,344 82
Passenger train supplies	8,577 35	11,016 67
Freight train service	37,991 29	38,155 80
Freight train supplies	1,378 49	2,036 32
Freight train mileage	12,324 80	16,850 64
Telegraph	8,463 27	8,967 10
Loss and damage	3,224 97	5,883 49
Personal injuries	41,826 36	12,562 55
Agents and station service	317,235 31	338,986 81
Station supplies	27,777 82	35,446 08
Balance of improvement account, above the sum reserved, charged to expenses	68,576 72	166,376 73
	$2,017,057 56	$2,159,057 08
Leaving as net earnings	$833,672 66	$832,372 67
From which deduct—		
Interest on bonds	$245,000 00	$245,000 00
Dividend 4 per cent. May	280,000 00	280,000 00
Dividend 4 per cent. November	280,000 00	280,000 00
	$805,000 00	$805,000 00
Surplus	$28,672 66	$27,372 67

It will be seen that the gross receipts for the year 1883 were $2,991,429.27, against $2,850,730.22 for the previous

year, an increase of $140,699.53; the operating expenses and taxes for the year 1883 were $1,964,383.48, against $1,861,280.84 in 1882, an increase of $103,102.64.

At the commencement of the year the company had 86 locomotives; during the year 6 locomotives were added, of which 3 took the place of an equal number worn out and broken up, making the number at the close of the year, 89, of which 50 are passenger, 22 freight and 17 switching locomotives.

The company have also 155 passenger, 8 parlor, 35 baggage and mail, 1,904 merchandise, and 231 gravel and other cars, and 12 snow ploughs. Of these, 13 first-class passenger, one combined passenger and baggage, and 175 freight cars have been added during the year. One passenger car has been remodeled into a paymaster's car, with all the conveniences necessary for safely transacting the business of paying the large number of employés scattered the entire length of the road.

There were laid down during the past year 3,331 tons of steel rails and 123,372 ties, of which 966 tons of rails and 26,309 ties were placed in the second track. The double track was extended during the year five miles, and at the date of the report, November 20, 1883, construction was going on between Old Orchard and Scarboro, the rails having been laid between Pine Point and Old Orchard. The grading between Pine Point and Scarboro was also nearly completed, and will be ready for the rails early in the spring.

Referring to the lease, by the Boston and Maine Railroad Company, of the Eastern Railroad, the report says:

"A lease of the Eastern Railroad to this company upon terms agreed upon by your Directors and those of the Eastern Railroad Company was ratified by both corporations at meetings held on March 28, 1883, to take effect when duly authorized by the laws of New Hampshire. Such authority was obtained at the session of the Legislature of that State held last summer.

"Meantime on May 1, one of the trustees appointed under the mortgage of the Eastern Railroad Company presented to the Supreme Judicial Court of Massachusetts a bill in equity praying the Court to enjoin that company from executing the lease, substantially on the ground that it does not provide for the sinking fund established under that mortgage for the benefit of the holders of the certificates of indebtedness secured by it.

"The remaining trustees have refused to join in the bill as plaintiffs.

"The existence of this suit has hitherto delayed the execution of the lease, and the suit is still pending.

"The Boston and Maine Railroad is not a party to it, and at a preliminary hearing the Court has decided that it need not be summoned in as such, but has directed notice of the pendency of the suit to issue to all the holders of the certificates of indebtedness of the Eastern Railroad. The term of this notice will expire in January next. There appears to be no reason why the argument of all questions mooted in the case should not be had before the full court in the coming March."

The double track on the Lowell and Andover Railroad (leased by this company) was completed to Wamesit station, 5½ miles, on the 18th of October, when regular trains commenced running over it. The remaining 3 miles were to have been ready for use by the 1st of January, 1884. The cost of this work is to be repaid by the Lowell and Andover Railroad Co. upon the termination of the lease.

A road was built during the year from Kennebunk to Kennebunkport, 4½ miles, under a lease to this company for 99 years from May 15, 1883, at 4½ per cent. on a cost of $65,000. This road was opened to the public June 18, 1883.

The number of passengers carried during the year was 6,488,756, against 5,984,000 in 1882, an increase of 504,756; the number carried one mile was 85,216,481, against 81,641,541 in 1882, an increase of 3,574,940. The number of tons of merchandise carried was 946,906, against 904,966 in 1882, an increase of 41,940; the number carried one mile was 48,736,777, against 44,882,394 in 1882, an increase of 3,854,383. The number of miles run was 2,028,735, against 1,945,599 in 1882, an increase of 83,136.

TREASURER'S TRIAL BALANCE, SEPTEMBER 30,

	1882.	1883.
Construction	$9,512,780 26	$9,512,780 26
Equipment	1,242,330 00	1,308,180 00
Materials on hand	216,480 44	281,894 96
Cash	222,613 69	269,160 97
Notes receivable	86,200 43	143,608 89
Land and improvements Dover and Winnipiseogee Railroad	26,603 23	28,606 99
Dover and Winnipiseogee Railroad stock	263,144 48	263,144 48
Steamer Mt. Washington and wharves	69,260 24	69,260 24
Danvers Railroad bonds	125,000 00	125,000 00
Danvers Railroad account	27,430 00	27,430 00
Lowell and Andover Railroad betterments	58,774 42	122,510 14
Newburyport Railroad stock and bonds	302,001 95	302,001 95
Portland and Rochester Railroad	118,919 75	118,919 75
Due from station agents	80,764 98	80,812 57
Miller's River improvement	17,976 34	18,963 24
Land near State Prison, Charlestown	23,487 71	32,696 51
New double track	.....	69,070 88
New iron bridge "Cocheco River," Dover, N. H.	.....	9,695 55
Total	$12,393,667 92	$12,783,737 38
Capital stock	$6,921,274 52	$6,921,274 52
Seven per cent. bonds due 1893	1,500,000 00	1,500,000 00
Seven per cent. bonds due 1894	2,000,000 00	2,000,000 00
Notes payable	100,000 00	500,000 00
Lowell and Andover Railroad improvement account	4,434 43	4,291 38
Uncalled for bond interest	7,087 50	8,925 00
Uncalled for dividends	17,349 00	18,456 50
Accounts payable and pay rolls for September	175,534 14	190,317 30
Ledger balances	30,486 20	4,270 54
Profit and loss	1,637,502 13	1,636,202 14
Total, as above	$12,393,667 92	$12,783,737 38

President—GEORGE C. LORD.

Directors—George C. Lord, Nathaniel G. White, Amos Paul, Nathaniel J. Bradlee, William S. Stevens, James R. Nichols, John Felt Osgood, Samuel E. Spring, Nathaniel W. Farwell.

Treasurer—AMOS BLANCHARD.

General Superintendent—JAMES T. FURBER.

Auditor—H. W. B. WIGHTMAN.

Clerk—CHAUNCEY P. JUDD.

THE IRON TRADE IN 1883.—Secretary Swank, of the American Iron and Steel Association, says the year's production of pig-iron was equal to that of 1882, 4,623,323 tons; the consumption about 4,948,323 tons. The production of steel rails in 1883 fell off below that of 1882. There were also made probably less tons of iron rails than in 1882. The total rail tonnage of 1882 was 1,501,881 gross tons, of which 203,459 tons were iron rails and 1,304,392 tons steel rails. The total rail production for 1883 was probably 1,300,000 gross tons, of which 1,200,000 tons were steel rails. Our imports of steel rails for 1883 were about 100,000 gross tons as against 200,000 tons in 1882. In round numbers, our consumption of rails in 1883 was three hundred thousand tons less than in 1882.

THE United States Rolling Stock Company is actively pushing operations for its new extensive works on the Calumet River, some twelve miles south of the Chicago city limits. Shops are being erected, docks are being built, and grounds are being prepared for the new industrial city which will next year spring up—another marvel of manufacturing enterprise.

A LEADING feature of the *American Machinist* for January 19, 1884, is the article on railroad snow-plowing, by Angus Sinclair. It is accompanied by a finely-engraved sketch of the Cushing snow-plow.

Lubricating and Lubricants.

BY E. F. DIETERICHS, CLEVELAND, O.

II.

VARIOUS KINDS OF LUBRICANTS.

ALL fatty substances are used for lubricating purposes, but their characteristics are so different and the requirements for lubricating so manifold, that the selection of lubricants and the way of applying them are matters of considerable importance. All fatty substances are either liquid or solid, and either of animal or of vegetable origin. They are used in their natural state or compounded and mixed in various proportions with each other or with inert matter, such as lime, sulphur, lead, asbestos, graphite, soapstone, etc. Liquid fatty matter is principally used for lubricating lighter and fast running machinery; solid fatty matter on machinery with slower motion and of heavier weight.

LIQUID LUBRICANTS.

FATTY OILS.

All the fatty oils of animal or vegetable origin, and the so-called mineral oils, are liquid lubricants. These stand foremost among the oils of animal origin, sperm-oil, neats-foot oil and lard oil, followed by tallow oil and fish oils, and among the oils of vegetable origin, olive oil, rape or colza oil and castor oil; cottonseed oil, linseed oil and rosin oil belong to the class of drying oils which are unfit for lubricating purposes, and are seldom used by the judicious mechanic. All these oils, from the nature of their composition, are liable to decomposition, not only from the action of the heat emanating from friction on bearings or from the steam in cylinders, but also from simple exposure to atmospheric influences, especially when spread in thin layers over large and heated metallic surfaces, whereby their acids are set free and their bases readily combine and are converted into solid, gummy matter with the small particles of abraded metal, that in spite of the best lubricants will wear off when metal comes in contact with metal in motion. The temperature at which these oils vaporize is too high, and before they can radiate into space with frictional heat, they accumulate and retain enough of it to become decomposed.

MINERAL OILS.

The oils known as mineral oils in their natural state, do not present the same defects; they are not changed by atmospheric influence, do not form acids, but are lacking body, and heat affects them, and unless of lower gravity they are readily decomposed by frictional heat, and their light and dangerous vapors depart too fast to be able to radiate more than a very limited proportion of it into space. Those of heavier gravity are seldom free from grit (finely suspended silicious and dark-colored carbonaceous matter), and their accumulated deposits are equally if not more injurious to machinery and a drag on the motion, than the gummy deposits of the fatty oils above mentioned.

The so-called "reduced oils," and those resulting from distillation, derive their unctuous feeling and heavy gravity from the accumulated amount of paraffine wax and scorched carbonaceous matter in suspension. They have been deprived of their lighter hydro-carbons, and the thereby produced amount of wax and matter in suspension, and the temperature at which they vaporize, give them, apparently, greater heat-absorbing and more proportionate heat-radiating quality than the natural oils before mentioned, but their greater deposits of impurities and wax under frictional heat, and their inability to remain limpid at slight lowering of the temperature, class them with the poorer lubricants.

The oils known as "paraffine oils," derived from the residuum stock of distilleries, and refined and freed from all wax by cold and pressure, are by far the purest and best adapted for lubricating very light machinery, but do not possess sufficient body to prevent surfaces from abrading each other in motion under heavy weight; and those with apparent body from wax left from imperfect separation, are superior only in cleanliness to the oils reduced by steaming and distillation before mentioned, but like them form waxy deposits, which cause dragging on the motion, and they solidify too easily in cold weather.

Compounding paraffine oils with fatty matter makes a tolerably good lubricant; its value however, is proportionate only to the amount and quality of the admixed fatty matter, and gum is continually deposited in proportion to the amount of fatty matter contained in it, which is generally of poorest quality for the sake of bigger profits.

From all said in the above it will be seen that the best fatty oils deposit gum and the mineral oils paraffine-wax, and it shows that the fatty acids of the former and the oily hydro-carbons of the latter, alone are the real lubricants. By binding the fatty acids to a base to prevent decomposition and combining them with oily hydro-carbons of best quality, we form a lubricant which combines the best characteristics of both the fatty and the mineral oils, and as near as possible, all the following characteristics which a good lubricant must possess:

1. Sufficient body or viscosity to absorb the frictional heat as rapidly as it is evolved by friction.
2. Capability to vaporize at a temperature proportionate to its heat-absorbing powers.
3. Least inclination to decompose under atmospheric influence, temperature or steam.
4. Contain no free acids, gum or grit.
5. Retain a nearly uniform consistency at all temperatures.

COMPOUNDED OILS.

The lubricants called "compounded oils" comprise an endless variety of mixtures. The residuum oils and still-bottoms from distilleries are worked into cheap grades of oil by addition of lighter oils, often so light, and sometimes thinned down with benzine only, that their rapid evaporation under frictional heat becomes dangerous. They are made to show a plausible consistency and deceiving gravity, and are sold at all prices and under all kinds of names, such as Mecca and West Virginia oil, but are poor imitations of these once much preferred natural oils. The dangerous character of some of these mixtures is well known; they have been the cause of many fires and accidents. It requires only careless handling of lights near such oils while in store, in use or under shipment, to ignite the vapors arising therefrom to the danger of life and property, and it is astonishing, that as yet no steps have been taken by insurance companies and legislators to prohibit the sale and shipment of such lubricants, more dangerous than the vilest of burning oils prohibited.

Other oils of this kind are said to be improved by admixtures of rosin-paste or rosin-oil, and they are sometimes slightly improved by admixtures of very small quantities of fatty matter of the lowest order. They contain all the charred carbonaceous matter, the tar and grit from the stills, which no amount of steaming and pretended filtering is able to remove. That such oils are not efficient or economical, even at the low prices at which they are sometimes sold, will be seen when their characteristics are taken into consideration. Those "compounded oils," made from heavier mineral-oil, refined and bleached, and mixed in various proportions with animal or vegetable oil and fat, and those with extra additions of caoutchouc, wax, sulphur, graphite, etc., command their price and standing in the market, proportionate with the quality and quantity of the admixed fatty matter, and are sold under a variety of names often entirely inappropriate and deceiving the inexperienced as to their origin and quality.

Oil mixtures consisting of watery emulsions with the aid of alcaline or mucilaginous additions, hardly deserve mention. Their value also depends alone on the proportion of real fatty matter they may contain, but the temptation of apparent cheapness misleads, until slow but unavoidable injury convinces to the contrary.

SOLID LUBRICANTS.

Solid lubricants consist principally of tallow or lard or combination of either or both with palm oil, rape or colza oil or mineral oil, brought to proper consistency with weak lye, lime water or lime paste. Fatty matter of all kinds and quality, residuum and tar from refineries, in short, all that possibly can be worked into this kind of lubricators and can be given a greasy appearance and consistency, is worked into what is known in the market under the name of "grease." The additions of lime, graphite, lead, asbestos, sulphur, soapstone, etc., to greases used on machinery moving under heavy pressure and heat, act only as a medium. They fill and accumulate in the interstices of the bearings, and like the metallic, compositions serve as a sort of cushion for the lubricant.

The character of the machinery for which this kind of lubricants is used, is of the grosser, heavier kind; hence less attention is given by mechanics to ascertain the indirect advantage that would result from the use of grease of best quality, and cost is generally the only point considered. Here also is the fatty acid alone, the lubricating, that is the heat absorbing and vaporizing principle, held to the moving surfaces by medium of the stearine, palmitine, paraffine or rosin, which ultimately are left as concentrated and charred gummy deposits.

It is a great error to compound liquid lubricants with inert matter, such as plumbago, asbestos, etc., under the delusion that such additions increase the lubricating power of the lubricant. On the contrary, whatever the value of the lubricant otherwise, it is actually made worthless by such additions. The circumstance that hot bearings are sometimes effectually cooled by application of plumbago or like inert matter, has misled some of the best mechanics into the belief of their value as lubricants. When a bearing becomes heated, from whatever cause, either neglect of lubricating, inefficiency of the lubricant, or mechanical defects, the metal expands and the moving parts are thereby brought into so close contact with each other that the lubricant, however good, is incapable of penetrating between them; it decomposes and vaporizes faster than it is able to absorb the accumulating heat. By suddenly applying a heavy body of fatty matter in the shape of a piece of tallow or a candle, the heat is rapidly absorbed and transferred to the regular lubricant, and the metal, becoming relieved of the accumulated heat, contracts, and the regular lubricant succeeds in penetrating between the surfaces, and if attentively applied will prevent further overheating. The same is the case when we apply plumbago or other fine inert matter to heated bearings. This is drawn in between the moving surfaces by their velocity, and opens the way for the lubricant to penetrate between its particles, and serving as a sort of cushion, absorbs a large amount of the accumulated heat, which it transfers to the vaporizing lubricant. If, however, we think to conclude therefrom that a lubricant mixed with such inert matter must be equally efficient with daily applications for some time, we misunderstand the cause of the action, and simply accumulate inert matter on bearings or in cylinders; and vaporizing lubricant will finally be unable to vaporize all the increased heat which the accumulating incumbrance and drag on the machinery is creating.

What was said here holds equally good with solid lubricants, often compounded with large additions of inert matter, as plumbago, asbestos and such like. If lubricating was simply a mechanical action, these additions would be in place, and one application of such compound would serve as a cushion for any length of time, but as lubricating is a chemical action based on the vaporizing of the interposing lubricating substance, the fatty acids of the fatty matter in such grease compounds alone are able to vaporize with the heat, and at every renewed application leave the inert matter behind, together with the gummy deposits, to cause dragging on the motion. These deposits accumulate more and more, and finally hardening under the heat they absorb, abrade and injure the machinery unless removed by continued cleanings.

(To be continued.)

THE attention of the reader is called to the announcement of Le Page's Liquid Glues, made by the Russia Cement Company, Gloucester, Massachusetts. These and the Russia Belting Cement, manufactured by the same firm, are of the utmost value in numberless descriptions of work, including all those in which any kind of glue or sizing is required. Such variety of utility characterizes very few articles.

A PARTY will leave this city on the twenty-sixth of January, 1884, on an excursion to Cuba and Nassau, New Providence. This is the third annual mid-winter excursion to those places, organized by Messrs. Leve & Alden, No. 207 Broadway, New York. Nearly forty days will be spent by the excursionists in warm latitudes, at a time when the climate here is a varying torture.

THE attention of readers is directed to a pamphlet published by the H. W. Johns Manufacturing Company, No. 87 Maiden Lane, New York, containing a variety of information concerning the use and value of asbestos in building, economy in the use of machinery, etc.

HE that gets out of debt grows rich.

Communications.

As readers find under the above head, a variety of conflicting opinions expressed by numerous correspondents, there is no need to say that the editor is not responsible for the views expressed in this department. He respectfully invites communications from all who desire that what they think or know on railroad subjects shall be placed before a numerous, interested and influential class of readers, in a style, as to printing and appearance, which invites to thorough perusal and consideration.

Editor American Railroad Journal:—

The heating and ventilation of passenger cars successfully is no easy problem, although to the layman, the difficulties do not appear. The writer's experience has been that the more complicated and radically "scientific" plans are seldom successful, probably because the exact manner and time in which this device is to be opened, or that one shut, is never clearly understood by any one save the inventor; and as the brakeman has the handling and control of the management of this feature of railroading, he cannot be expected to exhibit many scientific attainments or understandings for the munificent compensation of $50 per month, and so many ventilating devices, for want of proper handling, are failures. It is of course a fault of the device, for no matter how perfect its action may be, if properly cared for, the fact that the brakeman is to handle it and not the inventor, should be kept in view by the latter. Unfortunately, this important factor is too often overlooked. It seems as if there were less complaints twenty years ago about "the vitiated air of passenger cars," when a box stove, holding a wheelbarrow load of wood was used on heavily timbered roads, or a "cannon stove" on coal roads, than there is at the present day, with the many improved arrangements. It may be that the passengers are educated up to a much higher appreciation of their due as passengers, than in the days gone by. It is clear that the ventilation and heating of passenger cars go hand in hand, being mutually dependent on each other, and that hot air ascends, and vice versa. Simple as these facts are, they are frequently overlooked, when the subject of this article, of which these facts are the very foundation, are considered by the designer. Several very expensive day cars were recently built with improvements in the ventilation, but it was found that these cars in summer were ten degrees hotter than cars built nearly twenty years before, and running in the same train. The present system of heating cars by running steam or water pipes, or hot air conveyors along the floor at the sides of the cars is undoubtedly superior to stoves, but when combined with ventilators kept open in the deck of the car to any extent, the result is that the car is kept cleared out of its heat, or if the ventilators are closed the car is soon overheated with impure air, and this is the result of nine out of ten ventilating systems.

If, however, openings are provided in the ends of the car, or doors near the floor, the deck ventilators kept closed, and fresh air allowed to find its way in at the forward end of the car near the stove or heater, or through a jacket surrounding them, the car can be kept comfortably warm and the impure air forced out of the car without robbing it of its heat at the same time and by the same means. The heat given off by the heating pipes rises to the top of the car, where, if the ventilators are open, it finds an exit. If, however, the ventilators are closed, the car fills with warm air, and the impure air, with its heavy load of carbonic acid gas, is forced to the floor and escapes at the rear end, through the openings referred to. A prominent master car-builder informed the writer that he had used a plan embodying these principles with splendid effect. His plan consisted of encasing a pipe between the windows, extending from the floor through the roof. At the floor an opening was provided for the pipe, and covered with netting. At the top of the pipe a hood with a vane was provided, by which means the mouth of the hood was kept always opened to the back of the train. When the train was running, the rapid passage of the hood through the air, acting on the principle of induced currents, kept an upward movement through the pipe, thus drawing off the air from the bottom of the car instead of the top, by which means the car was kept not only warm but well ventilated. Four of these ventilators on each side of the car were used, although the gentleman referred to thought more would give better results. A damper arrangement in the pipe made the ventilation or quantity of air drawn off adjustable.

Sinbad.

Editor American Railroad Journal:—

As a railroad man, I desire to protest against the great amount of shoddy and pinchbeck literature (?) practical railroad men are confronted with in many of the so-called "railroad papers." Practical railroad men have little time or inclination to write their experience or views, and in consequence the great mass of dry rot forced upon railroad men is written by clerks, boys, canvassers, advertising agents and what not, whose railroad experience consists of perhaps a half dozen rides a year on the street cars. If a master car-builder turns out a new passenger car, the next issue of the *Universal Water Closet* has the following delectable and instructive three columns on the subject: "Mr. End-sill, the veteran master car-builder, of the L. M. N. O. P. R. R. has just finished the most sumptuous, elegant, and convenient passenger car ever seen in this section. It is about three times the length of an ordinary freight car, and is painted in a delicate tint of pea green, and beautifully decorated. On entering the car we find a perfect palace of beauty and convenience, superbly designed and magnificently finished in costly woods of the Orient, leading the imagination to believe it is the veritable historic barge of Cleopatra," etc., etc. The practical railroad man is of course greatly enlightened by this valuable information, and files away carefully the paper containing it for future reference—in the waste basket.

If a new locomotive is the subject, the reader is salivated in about this style: "That thorough and experienced mechanic, Sandbox T. Reachrod, master mechanic of the X. Y. Z. R. R. has just turned out a superb new passenger engine, bearing the No. 12,299. She is built entirely from the original designs of Mr. Reachrod, and is the fastest engine ever built in this country. She is provided with four immense driving wheels, which are held relatively to each other by a massive bar attached to a gudgeon cast in each wheel. As we pass toward the forward end of this magnificent structure, reminding one of some fabled courser eagerly champing its bit in its desire to exhibit its paces, we find two brass cylinders provided with steam boxes. The piston is arranged to slide back and forth, thereby transmitting its ponderous force to the driving

wheels through the medium of an immense pitman rod. The boiler projects beyond the smoke stack quite a piece, and contains a smoke burning device, the invention of Mr. Reachrod, by which the large quantities of black smoke emitted by ordinary engines will be entirely prevented. This invention alone stamps Mr. Reachrod as the best mechanic of the age. The boiler, we are informed, is pierced for a large number of brass pipes called flues, by means of which the heating surface is greatly augmented. Pumps for forcing water into the boiler are entirely done away with, being replaced by an instrument called an 'injector,' and to Mr. Reachrod is due the credit of first discovering the merits of this extraordinary device. The truck wheels are made entirely of paper and demonstrate the wonderful uses to which this material can be applied. These wheels are strongly riveted to 'truck axles' which are supported on 'brass boxes.' The boiler is covered with planished iron, having a brilliant lustre, which is held in place by brass bands which also serve to strengthen the boiler against the enormous steam pressure, etc., etc. The veteran driver, Jack Pullheroverandplugher, has charge of the 12,299, and informs us that on the trial trip she performed admirably, the trip being interrupted but once by the slipping of the ash pan, which Jack quickly adjusted.

"We are further informed that this elegant piece of mechanism is intended to draw the Corn-cob and Huckleberry express which the managers of the X. Y. Z. R. R., ever watchful of the interest of their patrons, have put on for the summer months for the express purpose of accommodating their through travel, which has lately assumed immense proportions."

Or if the subject is "Internal passenger car ornamentation," the instructor of car-builders remarks: "All ornamentation, strictly speaking, should be accessory and not introduced or used in such prolific profusion as to obliterate, so to speak, the fountain head, as it were, of the immediate source from which it springs, and from this it would appear that the mechanical structure should necessarily form the paramount object in view, and treating the decorative and purely æsthetic features as secondary and subordinate." The extreme lucidity of this, to say nothing of the purely technical treatment, will insure every master car-builder in the land fully appreciating and understanding it. Or the thirsting railroad man is informed, anent accidents, that "some of the most serious and horrifying of railroad casualties are too often due in their causes to initial beginnings which cannot be foreseen nor provided against by finite intelligence, yet in the great majority of cases the cause is due to the absence of the most obvious and necessary precautions, and the most effectual preventive of such catastrophes is to be found in the most rigid and arbitrary enforcement of a correct and thoroughly devised code of special regulations, looking to the special end of preventing them."

This, it will be seen, covers the whole ground, and is so simple and sure, that it is to be wondered at that accidents will occur, when a thorough understanding of the above simple treatment of casualties would prevent them entirely.

I might go on indefinitely in imitation of the too prevalent style of literature prepared for the practical, frequently unlettered but self-educated and suffering railroad man and mechanic, who will read with avidity a practical article which he so seldom finds, but who "fires out" with remarks anything but scriptural, the class of papers dealing—from necessity—in a mass of words, thrown together by a writer who knows absolutely nothing, practically, about what he is writing. It is no wonder, then, that railroad men complain that they find more of interest to them and their business in a last year's almanac!

A SUFFERER.

Our Canadian Letter.

From Our Special Correspondent.

OTTAWA, January 8, 1884.

THE severe cold weather period having set in, railway construction in Canada is at a standstill; once, however, spring arrives, unprecedented activity in this direction is confidently anticipated, as the "first sod" will be turned on quite a large number of projected roads, branches, etc. From present appearances the "silver spade" will be freely brought into service.

The Canadian Pacific is fast pushing its way nor'westward; in six weeks' time the line will have been completed from Montreal to Algoma. There is only a link of a few miles between the last-mentioned station and Sudbury Junction to be finished. Freights are now running to the Junction. Passenger traffic is in progress as far as North Bay on the main line, and not many miles from Sudbury. Next May, when the road is in running operation to Algoma, the distance between Montreal and Winnipeg will be made in three days. A fleet of steamers will be utilized between Algoma and Thunder Bay, from which place to the bird's eye city of the northwest, the C. P. R. is now running, until such time as the all rail route around Lake Superior will have been finished. A gang of about five hundred Italian navvies, employed in the work near Sudbury Junction, were discharged within the past week. They returned to Buffalo.

As regards the C. P. R. line, west of Winnipeg, satisfactory progress was made during 1883. The track will, at the end of this week, reach the summit of the Rocky Mountains, thus fully carrying out the past year's programme of work, nearly six weeks ahead of the time allowed for it. At present there are about seven hundred and fifty men employed in the mountains; it is the intention to reduce the number immediately, and to confine the remainder of the winter's work to making ties and timber, forwarding supplies, and completing the final adjustment of the line.

Referring to the C. P. R., a leading commercial exchange, in reviewing the work of the past year, said, that "owing to the desperate efforts of persons on the stock exchange to depreciate securities, the Government have consented to guarantee the stock for ten years, to the extent of three per cent., taking ample security that the Dominion will lose nothing by its guarantee; the result so far on the stock has hardly been what was expected. It has, however, prevented it from being utterly wrecked, as appeared likely to be the case; and there is very little doubt that the advantage of the arrangement has been very great. The prospect is that the entire railway will be complete within two years."

The plan of the new bridge of the Ottawa, Waddington and New York Railroad, over the St. Lawrence Rive

from what is known as Ogden's Island, to Goose Neck Island, is now before the Privy Council here for approval. There are good grounds for the belief that the plan will be accepted. At the new site for the structure, the current is neither so speedy nor tortuous as the site first selected by the engineers. Navigation will be accommodated with a high level (sixty-one feet) bridge, and a swing bridge likewise. A director to-day informed the JOURNAL representative that in connection with the twenty mile branch south of the St. Lawrence to connect at Canton with the American system of railways, the necessary deposit has been made at Albany.

The survey of the Ontario and Pacific Railroad, a newly projected line, intended to connect Sault Ste. Marie on Lake Superior with Cornwall, on the St. Lawrence near Montreal, is in progress, the staff being at present engaged near Perth, above Ottawa. The president is Dr. Bergin, of Cornwall, who is apparently acting for a number of heavy capitalists, as yet unknown to the public.

At the coming session of Parliament, which begins on the seventeenth, the Grand Trunk will ask for power to consolidate and rearrange certain classes of its stocks and securities, for the purpose of providing additional capital to lay a second line of rails along portions of the road. They will also ask authority to create additional securities.

The following is the gist of the regulations for the transportation of goods in transit through the United States issued by the Dominion Government; goods of domestic origin may be transported from one port to another of Canada, over territory of the United States, with the consent of the United States authorities by routes designated and bounded for that purpose. Cars must be specially appropriated for such transportation, placed under customs lock, and sealed by an officer of the customs at the port of departure in Canada, and must remain sealed until they have passed through the United States and again arrived in Canada, when they may be released from further customs surveillance. Merchandise in bulk, which is incapable of being put in locked cars, may be transported on platform cars, carded and sealed. Imported goods in bond may be transported in like manner, under the usual transportation entry and bond. If merchandise, on reaching its destination in Canada, does not correspond with the manifest, if seals be lost or broken, or if packages, cars or seals appear to have been tampered with, the goods will be detained, if circumstances justify it, for seizure and forfeiture.

Haligonians annually become agitated with the winter port question. This time they appear bound to use their every effort in forcing the C. P. R. to adopt Halifax, instead of Portland, as its winter port. Numerous public meetings have been held in that city, and as an outcome, a series of resolutions have been adopted for submission to the Government. The effect of these resolutions is about as follows: That as the C. P. R. has it in contemplation to locate their Atlantic winter terminus at a United States port, and, whereas the C. P. R., although in one sense a private corporation such as would be, under ordinary circumstances, empowered to locate their road so as to secure the largest practicable profit to the company's shareholders, on the other hand, has undertaken a great national work with a view of building up and consolidating the various sections of the dominion: Therefore, within the opinion of the Council of Halifax, the projected location of the Atlantic winter terminus of the C. P. R. at a foreign port would be a direct violation of the principles enunciated and acted upon by the Government and parliament with respect to the road around Lake Superior, and an outrage on the people of the lower provinces; and that it is the imperative duty of the Government of Canada to take such steps as may be found necessary to secure the location of the Eastern winter terminus of the great inter-oceanic railway at a harbor within our own borders.

The advent of the new year brought with it, as generally happens, a disastrous railway catastrophe. On the second instant a terrible collision occurred outside of Toronto, at the Humber, on the Great Western division of the Grand Trunk, by which twenty-seven men lost their lives, and many more were fatally wounded. A suburban train was run into by a freight. All on board were employés of the Toronto Bolt Works; the accident caused great excitement. The conductor of the freight, who is charged with running without orders, is in custody. The victims were given an impressive public funeral. The relief fund had run up to the amount of $12,000, the Governor General subscribing $250. An investigation is in progress.

The C. A. R. has opened a passenger depot at the Chaudiere, next to the Union station, in this city. This is a great convenience to the traveling public.

Philadelphia and Reading Railroad.

THE comparative statement of the business of the Philadelphia and Reading Railroad and Coal and Iron Companies for November and fiscal year ending Nov. 30, 1883, shows: Total gross receipts of the railroad company for November, $3,654,916.21; total gross expenses, excluding rentals and interest, $1,581,435.45; profit for the month, $2,073,480.76; profit for the year to date, $14,547,479.25; profit for the same month of 1882, $1,104,564.49; for the year, $9,859,064.98; gross receipts of the coal and iron company for the month, $1,756,584.50; gross expenses, excluding interest, $1,363,379.64; profit for the month, $393,204.86; profit for the year to date, $921,771.79; profit for the same month of 1882, $303,121.24; for the year, $1,200,173.91. From this deduct for the railroad company: Debit balance renewal fund, $27,499.03; State tax on capital stock, $55,909.36; all rentals and full interest on all outstanding obligations, including floating debt, $12,101,666.89. For the coal and iron company: Full interest on all outstanding obligations other than those held by the railroad company, $1,126,942.70; total, $13,312,-017.98; surplus of both companies, $2,157,233.06; 7 per cent. on preferred stock, $108,626; 6 per cent. on common stock, $1,990,972.52; total, $2,099,598.52; balance applicable to interest on deferred income bonds, $57,634.54. The above statement includes the workings of the Central Railroad of New Jersey and branches for November, and for six months, from June 1 to Nov. 30, viz: Profit for the month, $124,407.51; for six months, $633,482.57.

A REPORT that the pig iron dealers of the United States were about to form a pool to control the output and the price of that product in this country, has been exploded by the dilligent researches of the *Iron Trade Review*.

A RETROSPECT:

BEING

A Complete History of Railroad Progress in America.

Compiled from this Journal, beginning Fifty-two years ago.

CHAPTER I.

Our First Number.

ITS CRUDENESS—BUT FAVORABLY RECEIVED—ITS APPEARANCE AND MAKE-UP—GENERAL VIEW OF ITS CONTENTS—THE STEAMIAD, A PROJECTED EPIC—THE JOURNAL STARTED IN STIRRING, EVENTFUL TIMES AT HOME AND ABROAD—LIST OF AMERICAN RAILROADS IN PROCESS OF CONSTRUCTION AT THE BEGINNING OF 1832—OF THOSE PROJECTED IN NEW YORK STATE.

Among the most cherished possessions of the publishers of the American Railroad Journal, is a complete file of its issues, from Vol. I, No. 1, bearing the date, "New York, January 2, 1832," to the present time. The purpose of a series of articles, beginning in this number, and to be continued in succeeding issues, is to review the contents of the early volumes of "the oldest railroad journal in the world." The writer's hope will be gratified should the reader find as much pleasure in following the results of his researches, as he has found in making them.

A quotation from No. 2, January 7, 1832, explains the remarkable crudeness which characterizes its predecessor, and aptly prepares the way for a description of No. 1. Speaking of this, the publisher, whose professional modesty appears in his use of the third person when meaning himself, says: "The haste with which it (No. 1) was got up (one week only having elapsed from the time he decided to publish it, before the first number was printed) prevented him from giving it that finish which a specimen number usually receives; that nicety of dress, so requisite to the favorable impression which a traveler should desire to make upon intelligent strangers, or that variety of matter and propriety of arrangement which generally secure the confidence and patronage of the reading community." The want of finish admitted by the "publisher and part proprietor," appears in the fact that part of the first impression was issued with the mistake of a year in the date—"1831" instead of "1832." It appears, notwithstanding its defects, that the new venture was well received, as note the following: "In presenting the second number of the American Railroad Journal to the public, the publisher cannot refrain from expressing his thanks to the editorial corps for the uniform politeness with which the first number of his journal has been received."

Said first number consists of sixteen pages of about the same size as those of the Journal as it appears now, arranged in three columns to each page. Its title is simply "Railroad Journal," and it is headed with an illustration thus described on page 3 of the issue: "The cut at the head of the Journal represents the locomotive engine, the Novelty, of Messrs. Braithwait & Ericsson (which competed for the prize of £500, offered by the directors of the Liverpool and Manchester Railway Co., and which would probably have taken it, but for some trifling difficulty in the machinery), and with a carriage for passengers of sufficient size to accommodate eighteen inside." The reader will note the distinction between English and American usage which obtained even at that early time, as regards the use of the words railway and railroad respectively; and that the English term carriage, meaning car, was then employed in that country. A prospectus signed "D. K. Minor, No. 35 Wall street, New York," is the first feature of the contents. It gives the full name of the journal, and as its principal object, "to diffuse a more general knowledge of this important mode (the railroad) of internal communication, which, at this time, appears to engage the attention of almost every section of our country." Moreover, Mr. Minor's arrangements with the New York *American* enabled him to promise that, the subject of internal improvement being first provided for, the remaining part of the paper would consist of "the literary, miscellaneous and news matter of the New York *American*, as prepared for that paper, omitting all political subjects, except such as are of general interest."

This association of matter being well edited, sufficiently accounts for the satisfactory character of Mr. Minor's experiment. There was not, at that early date in the history of railroads, sufficient matter on the subject to fill a weekly journal of the generous size produced. Hence the necessity of a good choice of miscellaneous matter, and the wisdom of procuring it by arrangement, from so well-informed and popular a paper as the New York *American*. While the compiler does not find very much railroad information in No. 1, its contents are exceedingly readable, and he may be pardoned lingering awhile over some of its miscellaneous features, as well as those specially important to his readers.

In a summary of news from Mexico, occurs the familiar name of our time-honored contemporary, the *Journal of Commerce*, as that of the authority for an item. The literary review includes notices of David Brewster's "Life of Sir Isaac Newton," and of "A Memoir of the Life of Daniel Webster," by Samuel L. Knapp. A poet who failed of immortality staggered the editor with the prospectus of his heroic poem, "The Steamiad," to consist of one hundred books, the arguments to three of which are subjoined, because they show how one man was moved to great thoughts by what he heard and saw of the "kettle on wheels" which has revolutionized modern civilization. His arguments are entertaining enough:

BOOK I.—*Argument*—Invocation to the Muse.—Heaven.—Hell.—Thunder.—Hoboken.

BOOK II.—*Argument*—Description of the Abyss of Space.—Conference between Neptune and Pluto about creating a power which shall be more tremendous than any of Jupiter's creations, and wholly under the control of these conspiring deities.—The parties quarrel.—The god of fire thrusts his glowing palm into the face of the god of water, and the STEAM SPIRIT bursts into existence.

BOOK III.—*Argument*—Pluto and Neptune become reconciled to each other by the mediation of Æther, and they consult in what manner to render the power thus accidentally called into existence subservient and useful to them.—They call in Vulcan to assist them with his counsel, who proposes that the spirit be first confined to a body, and avers, that thus incarcerated, he would be easily subdued to their designs.—They approve of his suggestion, and Vulcan immediately furnishes a close iron cauldron, and the book concludes with the wailings of the confined spirit.

It appeareth not to the contrary that the scribbler projecting the Steamiad remained a "mute, inglorious Milton."

Those were stirring times in Europe. England was agitating the Reform Bill; the king of Holland was giving trouble concerning the definitive settlement of the difficulty out of which had developed the independence of Belgium; France, scarcely emerged from the bloody Revolution of 1830, was in the throes of the constitutional changes necessary to the consolidation of the power of the citizen king; an unsuccessful insurrection in Poland had lately ended, and Greece had newly arisen into the family of nations. Apropos of this, the first issue of the AMERICAN RAILROAD JOURNAL contains an eloquent call, headed "Instruction to the Greeks," convening a public meeting at the Consistory Room of the Middle Dutch Church, corner of Ann and Nassau streets, New York, "for the purpose of coöperating with our fellow citizens in other places in the laudable effort of establishing at Athens, a literary institution for the instruction of the rising generation of that lately oppressed and truly interesting people." The list of names appended contains that of William C. Bryant. At home, slavery was agitating the counsels of Congress, but America's material progress was being honored in the great center of the world's commerce, significant of the after triumphs of her marine. The Grand Duchess Helene, of Russia, had lately been on board the New York packet-ship Ontario, Captain Sebor, at the London Docks, and had expressed herself in the highest terms of admiration of the beauty of the vessel, and of the superb style in which her cabin was fitted up. One cannot help wondering how long it will be before a similar incident is placed on record. The Equitable Insurance Company had just declared a dividend of three and one-half per cent., payable on the 3d of January, 1832; and the Farmers' Fire Insurance and Loan Company the same dividend, payable on the same day. At Baltimore, to the great satisfaction of the Baltimore *American*, measures were about to be taken immediately for the subscription of the capital requisite to build and put in operation a steam towboat, "of strong frame and great propelling power," and two steamboats had towed from the harbor of the Maryland port, through the ice, a fleet of outward-bound vessels, and had taken up, in like manner, several inward-bound.

But the reader is concerned more nearly with the state of the railroad industry of the United States on and about January 2, 1832, than with other matters, however interesting, and concerning which, only those subjects closely related with it, need to be mentioned hereafter.

The editorial opinion at the time was one "fast gaining ground in this country, that railroads will, in a great measure, supersede canals, and therefore hasten the construction of a few important lines, through those parts of the country where the amount of business will warrant the undertaking." Again: "It will be the aim of the publisher to show, what he thinks may be shown conclusively, that for practical purposes, railroads are far superior to any other mode of internal communication; and that they must, in a few years, entirely take the place of canals, where new works are to be constructed."

To inform his readers on a subject destined to be of such vast importance, Mr. Minor began a series of illustrated articles giving "a concise history of the introduction of railroads into England (which appears to have been as early as between the years 1602 and 1649, in the vicinity of Newcastle-upon-Tyne), with the various improvements, down to the present time; and to trace their introduction into, and peculiar adaptation to the business and climate of this country."

The following is given as the list of railroads in process of construction at the time, several of which were in part finished, and in successful operation:

Baltimore and Ohio—whole length, 250 miles—60 miles completed and in use.

Albany and Schenectady—16 miles in length—12 miles in use.

Charleston and Hamburg—135 miles in length—about 20 miles completed, upon which the United States mail is carried.

Mauch Chunk, completed and in use, 9 miles.

Quincy, near Boston, now in use, 6 miles.

Ithaca and Owego, 29 miles.

Lexington and Ohio, 75 miles.

Camden and Amboy, 50 miles.

Lackawaxen, 16 miles.

The following were then making, or soon to be commenced:

	Length in miles.
Massachusetts, from Boston to Hudson River	200
Ithaca and Catskill	167
Boston and Brattleboro	114
Columbia, from Philadelphia to Little York	96
Baltimore and Susquehanna	48
Boston and Providence	43
Frankston and Johnston on the Alleghany	40
Baltimore and Washington City	38
Hudson and Berkshire	25
Frenchtown and Newcastle	16
Harlem	6
Richmond and Chesterfield	12
New Orleans	6
York and Maryland, Tuscumbia, Philadelphia and Norristown, Philadelphia and Chester, Philadelphia and Delaware	distance not known.

Elizabethtown and Somerville Railroad in New Jersey.

At the same time notice had been given of application to the legislature of New York, at the session about to be opened, for railroads in different sections of the State, with an aggregate capital of over forty-two millions of dollars.

Of these projects, one is intelligently and powerfully advocated by the RAILROAD JOURNAL. The writer opens his argument in a good, old-fashioned way. He says: "Perhaps no one of the numerous applications which will be made to the legislature of this State, at its ensuing session, is entitled to more respectful consideration than that which is to be made for a railroad commencing at Lake Erie, at some point between Cattaraugus Creek and the Pennsylvania line and terminating in this city; passing through the southern tier of counties, and crossing the Hudson at some convenient place." The summary of his argument is thus expressed: "With one principal railroad through the southern part of the State, and several lateral roads from the canal, every step would be taken towards, and not from, market, as would be the case if the main road was on the north route, and the others intersecting it from the south." The time was ripe for internal improvements on a grand scale, to be effected in the Empire State, and, as has been shown, the people were prepared with over forty-two millions of dollars to make

railroads between designated points. The sanction of the legislature was all for which they were waiting. Evidently the inhabitants of New York State appreciated the advantages presented by the new mode of communication, demonstrating, as so often before and since, their practical sagacity and enterprise. Moreover, a journal specially devoted to railroad interests could not have been started at a time more opportune, and in a place more eligible than the greatest center of population in a commonwealth alive to the advantages and possibilities of a scheme connecting the majority of its counties with the metropolis, by the quickest means. The sanction of the legislature was asked on twenty-five projected roads, the chief of which were the following:

From Lake Erie, through the southern tier of counties, to the Hudson River, crossing a ferry, and then down on the east side to the city of New York—capital $10,000,000.

From New York to Albany, on the east side of the Hudson.

From the Hudson River, or from Schenectady to Buffalo, by the most convenient route, with branches connecting therewith the most important villages as shall not be on the main route of the railroad—capital $10,000,000.

Another, also from Albany to Buffalo—capital $7,000,000.

From Buffalo to Cayuga Lake, or the outlet thereof—capital $3,000,000.

From Utica to Cayuga Lake—capital $2,000,000.

From Rochester, through the Tonawanda Valley, to the Alleghany River—capital $1,000,000.

From Brockport, on the Erie canal through Batavia to or near Olean, Chatauqua county—capital $800,000.

From Schenectady to Utica—capital $2,000,000.

From Albany, on the west bank of the Hudson, or a more westerly route, to Catskill—capital $700,000.

From the City of New York to Manhattanville and Westchester, Putnam and Dutchess counties—capital $500,000, with privilege to increase.

From Watertown, Jefferson county, to the Erie canal, at Rome, and also to Lake Ontario or the River St. Lawrence—capital $500,000.

From Geneva to Ithaca, a continuation of the Canandaigua and Geneva Railroad—capital $500,000, with privilege to increase to $800,000.

From Oswego, Tioga county, to connect the Ithaca and Owego with the Lackawanna Railroad at the Pennsylvania line, near the Great Bend—capital $300,000.

From the foot of sloop navigation via the St. Lawrence to Lake Champlain—capital $1,000,000.

(To be continued.)

Finances of the Oregon and Transcontinental Company.

THE following is the last financial statement as to the condition of the Oregon and Transcontinental Company:

The committee appointed by the Executive Committee of the Oregon and Transcontinental Company to examine the assets and liabilities of the company and report thereon would respectfully represent to your committee that, in response to a suggestion in which they heartily concurred, Mr. R. G. Rolston was by them requested to join the committee and take part in the investigation. The committee was organized by the appointment of Mr. E. P. Fabbri as Chairman and Secretary, and at the earliest moment proceeded to the investigation of the company's affairs. The matter of the investigation being of an intricate character, and requiring many meetings, much time has necessarily been taken by the committee in arriving at the substance of their report. Inasmuch as the business and affairs of the company had been largely under the control and management of President Villard, his absence, in consequence of severe illness, during the examination has greatly interfered with the committee's labors and has prevented their making a report as satisfactory in detail as they would have desired. The committee would report:

That the assetts of the company, as shown by the books and from the certificates of parties holding securities as collaterals on loans, as well as the actual count of such securities as are in the possession of the company, are as follows:

	Shares.
Oregon Railway and Navigation Company	152,027
Northern Pacific preferred	153,700
Northern Pacific, common	147,934
Wisconsin Central stock	18,714
Milwaukee and Lake Winnebago preferred	2,775
Milwaukee and Lake Winnebago common	2,260
Oregon and California stock, preferred	150
Oregon and California stock, common	400
Oregon Iron and Steel Company	1,500
Oregon and California second mortgage bonds	$2,000,000 00
Lands earned and other real estate as per ledger	236,363 55
Oregon Improvement Company	514,128 33
Puget Sound Railroad under construction and not bonded	421,022 42
Northern Pacific Railroad Company, balance of account	1,240,206 42
Cash	195,927 52

And the liabilities of the company from the best sources at the committee's hands are shown to be as follows:

Bills payable	$10,562,500 00
Credited vouchers, as reported by treasurer	396,733 33
Oregon Railway and Navigation Company	48,895 41

The committee are informed that the bonds yet to be received from branch lines will meet the requirements for construction. Your committee has deemed it proper to state the assets at their face or share value, not considering it within their province or desirable to affix market values which are constantly liable to fluctuation.

In closing the report, the committee desire to express their appreciation of the readiness on the part of the officers and employés of the company to facilitate as much as lay in their power, the task assigned to the committee.

E. P. FABBRI,
WILLIAM ENDICOTT, JR.
R. G. ROLSTON.

NEW YORK, Monday Dec. 31, 1883.

FREDERICK BROUGHTON, late general manager of the Great Western Railway, P. O. box 38, Hamilton, Ontario, is offering his railway library for sale in one lot. The catalogue can be procured from that gentleman. As it represents a collection made during thirty-four years' management of railways, its interest is extraordinary. The books announced embrace, amongst others, bills in Parliament; evidence before committees; acts of Parliament; reports of and evidence before Royal commissions and Parliamentary committees; the proceedings of the English Clearing House, in MSS., for ten years; traffic and working agreements between many English companies; awards of arbitrators and umpires in cases of reference; Bradshaw's Manual, for twenty years; the *Railway Times*, for twenty years; twenty-five volumes of rare pamphlets on railway finance, management, etc., and several volumes of railway rules and regulations.

IN "A Temple of the Art Preservative of All Arts," Matthews, Northrup & Co., Buffalo, New York, have produced a pamphlet which is a luxury to see and to handle, and the briefly-written pages of which are suggestive to publishers of all grades. It is a description of the establishment of the publishers, accompanied by a calendar for the present year. The opening sentences show the sense which these gentlemen have of the quality of their pamphlet, one of which, by the way, is not at all exaggerated: "To you, O friend! (whose name we trust is Legion) lover of the beauteous, patron of letters, promoter of the arts, admirer of our Art, greeting!" By all means get a copy of "A Temple, etc.," if you can do so.

EVERY man is the son of his own works.

Tramway.

[The English word "tramway," now used universally in every English-speaking country excepting the United States, is adopted as the name of this department, because it is of greater convenience, being more specific in its meaning than "street railway."]

American Street Railway Association.

President.—William H. Hazzard, Brooklyn, N. Y.
First Vice-President.—James K. Lake, Chicago, Ill.
Second Vice-President.—George B. Kerper, Cincinnati, O.
Third Vice-President.—D. F. Longstreet, Providence, R. I.
Secretary and Treasurer.—William J. Richardson, Brooklyn, N. Y.
Office of the Association, cor. Atlantic and Third Avenues, Brooklyn, N.Y.

We observe that on at least one of the leading tramway lines of this city, no passenger is permitted to open the door nearer the horses. This, as it seems to us, is a commendable restriction, guarding the public, in some degree, against those draughts which, during the winter months, sweep with chilling and dangerous consequences through cars in which the provision indicated is not made. Its enforcement on lines carrying very many passengers, the Third Avenue, for example, would cause delay and inconvenience during certain hours of the day; but in all cases where these consequences would not follow, there seems to be no good reason why the example set by the management of the Second Avenue line should not be followed.

The problem of heating street cars cannot yet be regarded as settled, so many practical men objecting to the use of the stove, because finding in it disadvantages which more than outweigh the gain to the public comfort that follows its introduction. While this remains true, there is apt to be considerable value in the suggestion that only the back entrance to the car should be opened, excepting in cases when for greater ease in taking on and setting down passengers, this course is inexpedient.

The leading feature in the condition of the street car business at the present time, unquestionably is the prominence of the question, Shall or shall not the cable system be applied in New York City? As our news columns demonstrate, the probability is that the answer will be in the affirmative. This much is certain, that the subject of the advisability or non-advisability of the innovation is being both intelligently and earnestly discussed.

In this season of the year particularly, when the proverbial trials of street-car horses are at their height, it does seem altogether too bad that, in the interest of these poor brutes, attention should be called of a necessity perceived every day, to the expediency, not to say duty, of adherence to the wholesome rule which prescribes that cars shall not be stopped anywhere excepting at crossings. Perhaps 'tis as well to blame stupidity for what seems very much like cruelty in those offenders against the rights of our noblest dumb servants, who would stop them and compel the strain of restarting oftener than is prescribed in the regulation to which reference has been made.

With the present number, the very practical series of articles on painting street cars comes to an end. Their value is of the highest to those who either make or use cars, and we advise such who do not already possess the three parts constituting the series, to make sure of an excellent possession by sending to the office for the missing number or numbers.

A verbatim report of the second annual meeting of the American Street Railway Association, held in Chicago, October 9 and 10 last year, has just reached us. It is handsomely printed, and well done in every respect; and will certainly be in large demand, as it deserves to be. This very valuable pamphlet of 144 pages may be procured at the office of the Association, corner Atlantic and Third avenues, Brooklyn, New York.

History of Traction By Cable.

The following is the first of a series of articles written for the American Railroad Journal by Paul Van Der Voort, Secretary of the Lighthall Cable Traction Company, Washington, D.C., whose facilities for procuring information are of the best, as the subjoined communication demonstrates. We bespeak for Mr. Van Der Voort that widespread, intelligent interest in his articles, which is due to their subject and the command of material and capability of handling it with skill and force which constitute his peculiar fitness for their authorship:

The history of cable railway invention dates back almost to the commencement of the present century. The amount of labor and thought expended upon this way of propelling cars or carriages is incalculable; the uses to which the various inventions have been put are numerous and ingenious.

The idea of propelling cars by an endless cable was even earlier than the invention of railways and railway steam engines. That the system has not been placed in general operation throughout this country is due to a variety of causes. That the cable method has not entirely superseded the slow-moving horse, is due to the long time required to perfect improvements in inventions heretofore made, to the fact that until recently a full knowledge of the system existed only in one city, which is remote from the center of population, and largely because until the present day, no person possessing the necessary ability, has advocated with power and conclusive force the great advantages and permanent value of the cable system. It took time to study deeply and profoundly into the various methods used in the past, as

the public at large, and even engineers, were in utter ignorance in regard to what had been done and the inventions which years ago had been patented in regard to this system of moving cars. No prior invention or improvement has ever been reached without deep thought and earnest search, and the more or less thorough knowledge of the art to which it relates, in anterior days. Moreover, to simply invent or originate an improvement is not enough. The true inventor must be practical, and possess the business tact and knowledge sufficient to properly place his invention before the public—to clearly explain his improvements, and above all to reap the fruits of his patient toil and devotion to the objects to be attained.

That after all these years there should only be cable railways in operation in a few cities in the most progressive nation on the face of the globe, will seem strange to your readers, when they learn that all the principal features of railways were patented long since, and were put in practical operation and attained a speed which has not been deemed possible in these later days. Especially in England was this true. No invented system ever reaches complete perfection until it has been years in practical operation, and until its countless details have been thoroughly tested by actual operation, and when the money forces are applied. The mighty engine and printing press, and any of the magnificent structures which have been invented, when standing idle and inert are very different to the eye from the same when placed in motion; when the lever is touched and all the component parts start into action, then the whole structure becomes a thing of beauty and conveys the idea of life and power fully exemplified.

The question of cable railways is now being thoroughly agitated throughout the country. The records in the Patent Office also demonstrate that many able inventive minds are deeply engaged, and that thorough study is being given to this branch. There is no doubt that the day is not far distant when the horses and mules, now pulling cars, will give way to the endless cable method, as the stage coach was superseded by the swiftly-moving locomotive. The question of accelerated speed alone will solve the problem. Operators and owners of street car lines are giving their attention to the cable system, and they all recognize the fact that they must come practically to the immediate consideration of this question.

Your readers will no doubt be interested in the early history and progress of invention in this direction, and the constituents of your valuable journal (the only recognized authority on street railways), will no doubt be glad that you have taken the trouble to have the question discussed in your columns. The writer will do this fairly and impartially, and state facts as he knows them, without prejudice, and in all cases with his authority in hand to fully sustain his position.

Some persons imagine, or seek to make people believe, that they are the original inventors of the system of propelling cars by an endless cable, moving in an underground slotted tube. A careful study into the art would have soon satisfied them that such was not the case. It is fully realized that many of the descriptions of early inventions are found in very rare publications which are extremely difficult to obtain. The collection at the writer's service was procured after careful search in this country and in Europe, and he does not know that a similar one exists in a combined collection. In the matter of railway inventions, especially in early days, it includes a full collection, with drawings to illustrate the same. The patents described in these books are old, and have long since lapsed, but the student and inventive mind should know before devoting study, means, and time to invent something new, that the idea had been fully met years before, and the fact published in the magazines of the day devoted to such topics.

In another communication, the writer will give a history of the early inventions of cable railways, and some details in regard to their operation.

(To be continued.)

Painting Street Cars.

BY AN OLD PAINTER.

III.

In a former chapter I called attention to a few of the colors used on street cars, and the harmonious combinations of the same. It is now my purpose to speak more particularly of the combination of colors for grounds, and the striping colors upon the exterior of street cars.

Some few years ago it was the custom to paint almost all cars in light colors, such as straw, cream, drab, etc., but the experiments made by first-class painters proved conclusively that darker colors were just as applicable if not better in many respects than light colors. A street car, though subjected to hard usage, in most cases by ignorant washers and cleaners, is not so badly used as the cars on steam roads, for they are generally housed when not in use, while it is seldom that a steam road furnishes cover for their cars; besides, the street car is not subjected to an atmosphere of sulphurous fumes, or pelted with gravel and sparks. Therefore, the arguments which have been advanced in the trade journals relative to light and dark colors do not apply to street cars. The street car is simply a wagon or omnibus in another form, and may be treated, so far as the painting is concerned, in a similar manner.

The use of light colors on wagons or carriages is very limited, as the wagon painter has found that other colors will outwear them, as a rule. Vermilion, bronzed greens, blues, black, etc., are the favorite ones, although cream and straw-color may be added to the list, for wagon work, while stages or omnibuses are mostly painted white. But the painting of stages in white is not so much on account of durability as it is to make them showy, and to lighten their otherwise heavy appearance. The monstrous furniture vans, now so numerous in our large cities, will be found painted in dark colors, with gold lettering, etc., upon their sides, and they are made far more durable in the painting by the wagon painter than the average street car, though these "big wagons" are seldom housed. The reason of this is that the work is better done. More varnish is used upon them, and the coloring, instead of being oily, or closely allied to the paint of the house painter, is, as it should be, japan colors, over a well-made foundation. The average car, when new, receives at most but three or four coats of paint, which is made porous, from loss of oil by absorption into the imperfectly filled pores of the wood, and the two coats of varnish are therefore sucked in

and virtually destroyed. It is therefore necessary, as said in a previous chapter, for the car painter to take a few lessons from the wagon painter, in order to make durable work.

Dark colors are being used now on many steam roads with satisfaction, but there are many who never gave a thought to one of the principal reasons of their durablity over light ones, which is, that a lesser quantity of oil is used in mixing them, for the dry pigment being used instead of keg lead ground in oil, the painter will use more japan or varnish, by which the paint dries harder and is not so readily absorbed.

Vermilion will turn dark quickly, if it be mixed with oil, as is seen in the work of the house painter, who depends upon oil principally in all his work, but if a quick-drying varnish, japan, or japan gold-size be used, the color will be far more durable. Vermilion is a good color for side panels, and will appear more brilliant if a green stripe be put over it. The green should be bright, and of a yellowish hue, rather than bluish. This too will be augmented by a fine line of white. The combination of red, green and a very little white will be found a pleasing one, and I think it the best that can be made. The striping on a panel should be *en relief* to appear well (as shown in cut), then the colors, put in as above, and a very handsome panel will result. The top stripe may be white, with black letters, shaded with light and deep orange; the sunk bottom white, with an outline letter shaded the same.

Umber colors are very durable and they make very handsome panel colors.

Umber is a natural dryer, and the color will dry hard to prevent absorption; a little oil may be judiciously added to paint having umber for a base.

Olive brown is formed by adding lemon yellow to the umber.

Chocolate color is made by adding a little lake or carmine to umber.

Burnt umber added to white forms drab.

Salmon color is made by adding yellow, white and red to umber in small quantities.

Orange-colored striping looks well on umber, put on as directed for green on red, set off by fine lines of white.

Sienna colors are also excellent ones, and such as tan color, leather color, Bismarck brown and chamoline will make good colors for car panels. The latter color is made of three parts sienna, one part white and one part lemon yellow.

The ground for sienna may be made of yellow ocher, which is a durable pigment and inexpensive. The striping on sienna colors is governed by the depth of the ground. Drab, green or orange colors will harmonize with them.

A beautiful color for cars will be found in golden ocher, an earthy pigment of great durability. Light and dark red may be used for the striping colors, or light and dark green, and black fine lines. Milan green, as well as its tints with white, is another good color; it has great body or covering power, and will give good satisfaction in coloring. Gold striping or its imitation, and red fine lines will best match it in its purity.

Gold lettering shows off nicely on green, and this should be shaded in vermilion and carmine, or in light green with white lights.

Lake colors appear well, but it is not advisable to use the pure lake, as it is fugitive, no matter how mixed. Take Indian red or Tuscan red to form a solid foundation, then glaze over with carmine or Munich lake. Green striping will look well, but gold is preferable. Gold will harmonize with almost any color, but its expense is one of the drawbacks to its extensive use.

Paris green is a poor color. It is difficult to either mix or apply, and its use is now almost obsolete. It may be used however to the best advantage by mixing as follows: Mix one pound of dry color with one part japan gold-size, two parts rubbing varnish, and three parts raw oil; add one ounce of sugar of lead, well pulverized, and grind fine in the mill. The ground for Paris green must be solid, for the color is transparent.

In closing my essay on colors, I must call particular attention to the fact that the painter should not use any great number of colors on one job; a few well-selected ones will give a better result. It is only the backwoodsman or the Southern darkey who would be pleased to see a dozen flashy colors in combination. The best effects for the average eye is that of harmony by analogy—one color with its several tints and shades—or, in other words, monochromatic. However, the street car painter may be allowed a little more freedom, for his vehicle should be a prominent one among those which crowd a city street, yet it should be neat and, above all things, be lettered plainly and well, that the stranger may know at a glance if he shall board it to reach a desired location or not.

THE END.

Corrected Returns from Boston.

A SUBSCRIBER residing in Boston does us the kindness to correct certain figures published in a recent number, to show the magnitude of the street car system in Boston. The following statement follows that of the railway commisssioners of Massachusetts, and is the returns from September 30, 1882:

	Cars Used.	*Men Employed.*
Metropolitan R. R. Co.	357	1,433
Union Railway Co.	162	554
Highland St. Railway Co.	94	335
South Boston R. R. Co.	83	366
Middlesex R. R. Co.	78	244
Lynn and Boston R. R. Co.	48	181
Charles River Railway Co.	10	35
Total	832	3,148

Our correspondent adds that there has been some increase in cars and men during the past year.

EXPLANATIONS of the workings of a new plan for elevated railroads have just been made before the Rapid Transit Commissioners by L. J. Wing, of No. 50 Cliff street, New York. In this scheme the cars are suspended below an elevated superstructure, and are moved by an endless wire cable. The bottom of the car will be twelve feet above the surface of the street, or on a level with the second floors of ordinary buildings. It is proposed to have no stations in the street, but to provide waiting-rooms in the second stories of buildings. People will enter the car by a door in the center, which will open on slides just opposite the station platform when the car stops. By this feature it is claimed that there can be no obstruction to light and air, and no inconvenience to passengers who do not wish to climb higher than the second story to reach a station.

TRAMWAY NOTES.

MR. SHERMAN, of the Chicago Elevated Passenger and Automatic Mining Railways, says that the chief claim of superiority in his system of road is cheapness of construction. Not more than 1,200 tons of iron are required per mile on any city street, the cost being about $74,000. No cross ties are used, the rails being laid on wooden cushions inserted in channel iron stringers twenty-four feet above ground. The cars run between the rails, and are supported by trucks placed above the windows. The propelling power is applied either by an endless cable underneath the car, or by an electric wire suspended just above the car roofs. When empty, the car is two-thirds heavier at the top than at the bottom, but when weighted with passengers, it is nearly balanced. The leverage of the wheels and the resistance of the atmosphere are therefore equally divided. The car wheels are double flanged and have oscillating axles, which prevent friction at curves in the rails. It is claimed that, in case of accident, the car cannot leave the track. A few weeks ago Mr. Sherman received a letter from James Gamble, No. 2 Wall street, New York, asking for estimates of the cost of construction for an elevated railroad in this city and for a road from Boston and Hartford to New York, Jersey City, Trenton, Philadelphia, Baltimore and Washington, to connect these places with Harrisburg, Pittsburg, Wheeling, Cincinnati, Chicago and St. Louis. Charles W. Tankersley is named as the promoter of the scheme.

THE London *Times* announces the death of Mr. W. Sheldon, who more than half a century ago had a large share in instituting regularity of communication between England and Scotland by means of stage coaches. Deceased was born at Kendal, Cumberland, in 1803. After a long connection with the coaching traffic, during which he personally took charge of the coaches from Birmingham to Carlisle, etc., he removed to London, and upon the advent of railways, devoted his energies to the development of urban passenger traffic. In connection with the London Omnibus Company, he soon established an excellent and cheap omnibus service. He also joined the notorious George Francis Train in building and working the first tramway in London. He disapproved, however, of the raised rail, and this eventually wrecked Train's experiment. Subsequently, Mr. Sheldon went abroad, and, with the assistance of his son, built and set in working order tramways in Brussels, Copenhagen, Madrid, Geneva, Bucharest, and Bremen. These were very successful, and the tramway question again came up in England. Deceased was associated with the companies which built the Glasgow, Aberdeen, and other tramways. He was an advocate of the system of light steam tramways for the development of country districts. Mr. Sheldon, who was a member of the Society of Friends, was known privately for his practical benevolence.

THE proposed route of the Lexington avenue cable railway, this city, is that it start in Harlem and run in a straight line down the surface of Lexington avenue to and through Irving place. After crossing Fourteenth street it will cut through private property to Lafayette place. At Great Jones street the surface line will end, and an inclined plane will lead through two blocks of private property, becoming at Crosby street an elevated cable road. The elevated road will run down Crosby street, and at Grand street will turn through private property to Elm street, from there turning through private property to a station, which will stand on the west side of the City Hall station of the present elevated road. The line will then cut through French's Hotel and other private property to William street, continuing along William street to Wall street, where the elevated line will end. From Wall street the line will follow the surface along Beaver street to the front of Bowling Green, and make a circle around State and Whitehall streets to Beaver street.

ON the evening of the fifth of January, a fire was discovered in a shed owned by the John Stephenson Company, surface car builders, this city, and used for the storage and seasoning of lumber. The shed was fifty feet wide by forty feet deep, and was filled with valuable lumber, chiefly oak and maple. An overheated stove set fire to the lumber, which burned fiercely. It was nearly an hour before the flames were under control. The shed was entirely destroyed, together with much of the costly lumber stored in it. The loss is estimated at ten thousand dollars, which is only partly covered by insurance.

THE railroad from Liege to Maestricht, says a Belgian paper, has obtained permission to put upon its track between Liege and Vise small trains made up of cars of the ordinary horse car pattern. These trains stop between stations, and they are found to be a great convenience for the small villages along the route. The object of the company in inaugurating this system of conveyance was to prevent the establishment of a competing street car line.

A BILL in equity has been filed in the United States Circuit Court by the Cable Railway Company against the Market street Cable Railway Company, Leland Stanford, Charles Crocker, Charles F. Crocker, W. V. Huntington, and Nicholas T. Smith, praying that the defendants be restrained from making and using any truck or dummy with a gripping device attached thereto embracing the invention of plaintiff, and that the same may be delivered and destroyed, etc.

THE members of the American Society of Civil Engineers, have inspected the cable system of cars on the Brooklyn bridge. Col. Paine explained his grip in full, and the members expressed themselves as being much pleased with it.

LUMINOUS paint has been applied to harness with desirable results. At night the position of the horse is clearly indicated, and it does not appear that the animal is alarmed in the slightest by his bright equipment.

IN the Court of Special Sessions New York, recently, a man was found guilty of a misdemeanor in throwing snow and ice on the tracks of the Christopher and Tenth street Railroad and fined twenty-five dollars.

PRESIDENT C. B. HOLMES, of the Chicago Cable Road, states that after the heavy snow the cable road in that city worked perfectly, while on the horse roads there was much trouble and delay.

DR. JOHN C. PETERS, in an article published in the New York *Medical Journal*, says that "pink eye" is self-limited ordinarily, so that palliative treatment is all that is required.

List of Recent Patents for Inventions Relating to Tramways.

[Articles describing the more important of these follow this list.]

BEARING DATE DECEMBER 4, 1883.

289,375. TRACE-FASTENER: William L. Beach, Webster City, Iowa. Filed Sept. 21, 1883.
289,402. HORSESHOE: Isaac Fenno, Boston, Mass. Filed Jan. 29, 1883.
289,403. HARNESS-TRACE: George Shattuck Gates, Athol, Mass. Filed Sept. 5, 1883.
289,406. APPARATUS FOR CHECKING AND CONTROLLING HORSES: Henry Gottheimer, Brooklyn, N. Y. Filed Aug. 13, 1883.
289,452. BRIDLE-BIT: E. Eugene Sargeant, Newark, N. J. Filed Sept. 25, 1883.
289,504. HORSESHOE: Daniel Crane, Seneca Falls, N. Y. Filed June 30, 1883.
289,519. TRACE-SUPPORTER: George F. Eberhard, Cleveland, and John E. Renz, Medina, Ohio. Filed Aug. 8, 1883.
289,527. GRIP OR CLUTCH TO BE USED ON ENDLESS-CABLE WAYS: William A. Gilday and Thomas M. Heckman, Philadelphia, Pa. Filed Sept. 7, 1883.
289,563. TRACTION-ROPE RAILWAY: John H. Robertson, New York, N. Y. Filed May 23, 1883.

BEARING DATE DECEMBER 11, 1883.

289,904. MOVING STREET-CARS ON CURVES: Noble Andrew Fisher, Sacramento, Cal. Filed Dec. 28, 1882.
290,003. CABLE-GRIP APPARATUS: Henry Dods and Frank Hindes, Virginia City, Nev. Filed Oct. 16, 1883.
290,091. HORSESHOE: Joseph Nester, Wapakoneta, Ohio. Filed Oct. 30, 1883.
290,096. BOOT FOR HORSES: James O'Brien, New York, N. Y. Filed Oct. 12, 1883.

BEARING DATE DECEMBER 18, 1883.

290,198. HORSE-BLANKET FASTENER: Alexander F. Armstrong, Edinburg, and Milo K. Waite, Northville, N. Y.; said Waite assignor to Lewis Balch, Albany, N. Y. Filed June 13, 1883.
290,263. HORSE-BRUSHING MACHINE: Ellis Pennington, Philadelphia, Pa. Filed Oct. 20, 1882.
290,591. HAY-CARRIER: William Louden, Fairfield, Iowa. Filed Sept. 15, 1883.

BEARING DATE DECEMBER 25, 1883.

290,661. HAME AND COLLAR FASTENER: John F. Becker, Ward, Minn. Filed June 19, 1883.
290,673. HORSE-COLLAR FASTENER: William L. Fries, Milton, Pa. Filed Oct. 3, 1883.
290,707. CABLE-RAILWAY APPARATUS: Charles W. Rasmusen, Chicago, Ill. Filed April 23, 1883.
290,803. BRIDLE-BIT: Conrad Scherling, Guttenberg, Iowa. Filed Oct. 23, 1883.
290,826. COMBINED BRIDLE AND HALTER: Merritt F. White and David G. Sheridan, Bridgeport, Conn. Filed Jan. 23, 1883.
290,859. BRIDLE-BIT: Clarence A. Chandler, East Bridgewater, Mass. Filed April 6, 1883.

Advertising Device for Cars.

AN invention relating to improvements in display cards for street cars has been patented by Ernest Kitz, of Indianapolis. Its object is to provide a canvas belt to move on pulleys, with mechanical arrangements for moving the same, and thus bringing into view alternately the various signs, cards, or notices printed thereon. The precise means by which this is done are hereafter detailed, so far as is practicable without the use of cuts.

The device is attached to the car. A chain wheel is mounted on the axle of one of the car wheels, with sprockets to receive the links of an endless chain, by means of which, power is communicated to a chain wheel mounted on a shaft, and attached by means of hangers to the bottom of the car, and provided with a bevel cog-wheel to engage with a bevel cog-wheel mounted on an upright shaft, supported at each end by means of journaled boxes to the side of the car, said upright shaft extending upward to the place of display, and these provided with a flange pulley, around which a belt of canvas passes, which belt, extending to the opposite end of the car, revolves on an adjustable pulley. This adjustable pulley is attached to the car and pivoted at two points to a sliding frame, which slides transversely between two bars, and is provided with an adjusting screw, which is provided with a stationary nut and handle, by means of which the adjustable pulley before mentioned is adjustable to the length of the canvas belt. The chain wheel mounted on the axle of the car wheel is constructed in halves, with flanged ears to receive bolts, by means of which the halves are united into a complete wheel.

The canvas belt being supplied with the desired display cards, and stretched over the flanged pulley and the adjustable pulley, and brought to a proper tension by means of the adjustable screw provided in the device, the operation of the improvement is as follows: The car being in motion, the axle supporting the chain wheel revolves, imparting motion to the endless chain, and thus operating the chain wheel. This chain wheel being mounted on the shaft attached to the bottom of the car, turns the bevel wheel which engages with that bevel wheel mounted on the upright shaft, thus imparting motion to the pulley on which the canvas belt revolves. The effect of this is to bring into the view of persons both inside and outside the car, such signs, cards or notices as are alternately attached to the canvas belt.

This ingenious manner of multiplying the value of street cars as an advertising medium, will be more fully explained by the inventor, to those who apply to him for the information. Its object certainly commends it to attention in these days of multiform ways of making business announcements.

THE Industrial Publication Company, of New York, have just published a pamphlet entitled, "How to Become a Good Mechanic." Written by "An Old Apprentice," it is a practical guide to mechanics who love knowledge, and who wish to acquire those branches which will be of the greatest use to them. The little book is pervaded with good sense, and has "character." Its writer is dogmatic and straightforward to a degree which fastidious people might call rude, but we are not at all disposed to quarrel with qualities which superadd to the essential interest of this little work. Most readable and of great practical value, we recommend "How to Become a Good Mechanic" without reserve. While encouraging and likely to be of great service to the class of persons for whom it was written, nobody can read it without profit, not to say entertainment.

VOL. XI of the *Washington Law Reporter*, is completed with the issue of December 29, 1883. Its editor, George B. Corkhill, gives his brother lawyers, in this weekly publication, a well selected array of various important legal decisions, made in many courts.

OUR enterprising contemporary, *The Free Press*, of London, Canada, is advertised, among other ways, by an excellently printed and illustrated office calendar for 1884. This is one of the most desirable things of the kind we have seen.

GO into the country to hear what is the news in town.

New Inventions.

IMPORTANT TO INVENTORS.

This department of the American Railroad Journal is devoted to descriptions of the many and interesting New Inventions applicable to railroads, and in order to make it as complete as possible, inventors whose improvements properly come under this description, are invited to send us a detailed account of the same. This should consist of facts only, presented in clear and concise language, written only on one side of the paper, and the sheets numbered consecutively. In all cases in which it is desirable and practicable, the written description should be accompanied by a cut or cuts illustrating the invention. This or these should be marked distinctly on the bottom, with the name and address of the sender. All cuts received are preserved at this office, or returned, if desired, to the person sending them to us for use. As we have an engraving department we are prepared to make cuts, and furnish estimates of our charges for the same to those persons who write us for such particulars. That we may estimate exactly and without delay, it is necessary that we have sent to us, a photograph of the Model and a copy of the Specifications.

The reader of course understands that the editors reserve their inalienable rights to decide what "copy" they shall use, what changes shall be made in it, if any, and when they shall use it; but they guarantee the impartial consideration of every description sent them.

Descriptive articles relating to Tramways will be placed in that department.

List of Patents for Inventions Relating to Railways.

BEARING DATE DECEMBER 4, 1883.

289,377. RAILROAD SWITCH AND FROG: Henry Berlin, Pittsburgh, Pa., assignor to himself and Frederick Austin, same place. Filed July 18, 1883.

289,379. TRACK-BOLT LOCK: D. Franklin Blighton, Buffalo, N. Y. Filed May 19, 1883.

289,385. RAILWAY-SIGNAL: George F. Carlile, Bloomington, Ill. Filed June 14, 1883.

289,399. CAR-COUPLING: Charles Bell Emerson, Lynn, Mass. Filed Sept. 25, 1883.

289,407. CAR-COUPLING: Richard. E. Gray, Williamsport, Pa. Filed Dec. 8, 1882.

289,431. BRAKE-BEAM: A. H. McAlpine, Columbus, Ohio. Filed Aug. 24, 1883.

289,445. GRAIN-CAR DOOR: Francis Pond, Hinsdale, assignor to himself and W. M. Pond, Chicago, Ill. Filed Aug. 2, 1883.

289,465. RAILWAY-RAIL JOINT: Sol. F. Stever, Fairfield, Iowa. Filed Dec. 29, 1882.

289,474. CAR-BRAKE: Byron Van Wie and John Taylor, Troy, N. Y. Filed April 12, 1883.

289,529. CAR-COUPLING: Aaron B. Groff and Ambrose E. Strayer. Lilleyville, Pa., assignors of one-third to Oliver C. Groff, same place. Filed June 12. 1883.

289,530. COUPLING-LINK FOR RAILWAY-CARS: Allen Hackett, La Grange, Me. Filed Sept. 29, 1883.

289,611. CAR-COUPLING: Levi Isaac Bodenhamer, Kernersville, and William Edward Ashley, Raleigh, N. C.; said Ashley assignor of one-half of his right to said Bodenhamer. Filed Sept. 12, 1883.

289,614. CAR-PLATFORM: William Fuller Brown and Charles Lenard Haight, Poughkeepsie, N. Y. Filed Sept. 8, 1883.

289,617. CAR-COUPLING: Adoniram Judson Chapel, Arkansas City, Kans. Filed Oct. 1, 1883.

289,628. RAILROAD-RAIL: William M. Dayton, Waupaca, Wis., assignor to himself and Winfield S. Bemis, same place. Filed May 31, 1883.

289,633. RAILWAY-SWITCH STAND: Henry Elliot, St. Louis, Mo. Filed June 7, 1883.

289,657. CAR-STOVE EXTINGUISHER: Christ Hittinger, Dayton, Ohio. Filed Aug. 15, 1883.

289,677. RAILROAD-SWITCH: George McCall, Philadelphia, Pa. Filed June 5, 1883.

289,681. CAR-COUPLING: John K. McLeod, London, Ontario, Canada. Filed Sept. 19, 1883.

289,705. LOCOMOTIVE COW-CATCHER: William Phillips, Marshfiled, Oreg. Filed May 9, 1883.

289,712. CAR-WHEEL: David William Reese, Canal Dover, Ohio. Filed Oct. 4, 1883.

289,713. CAR-WHEEL: David William Reese, Canal Dover, Ohio. Filed Oct. 2, 1883.

289,726. SAFETY-GATE FOR CAR-PLATFORMS: Edwin L. Tevis, Philadelphia, Pa., assignor of seven-tenths to James N. Whelen, same place. Filed Oct. 18, 1883.

289,729. CAR COUPLING: William H. Thurmond, Forsyth, Ga. Filed Sept. 25, 1883.

289,739. AUTOMATIC SWITCH-SIGNAL: Algernon L. Wilkinson, Huntsville, Ala. Filed June 23, 1883.

289,741. METHOD OF CASTING CAR-WHEELS: William Wilmington, Toledo, Ohio. Filed Oct. 20, 1883.

289,770. RAILWAY-BRIDGE INDICATOR: Elam A. Gross, Camden, N. J. Filed July 6, 1883.

289,782. CAR-COUPLING: Frederick H. Rudd, Hebron, Nebr. Filed Oct. 6, 1883.

BEARING DATE DECEMBER 11, 1883.

289,806. RAILROAD-TIE: Thomas J. Bronson and Alexander Armstrong, Jacksonville, Ill. Filed July 20, 1883.

189,827. RAILWAY SIGNAL APPARATUS: Oscar Gassett, Boston, Mass. Filed Aug. 6, 1883.

289,852. CAR-COUPLING: Alfred T. Odell and John H. Cordell, Marshall, Mo. Filed Oct. 17, 1883.

289,866. SAFETY-BRIDGE FOR RAILWAY-CARS: Alphonso B. Smith, San Francisco, Cal., assignor to Solon Pattee, same place. Filed April 18, 1883.

289,895. ELECTRIC LOCOMOTIVE-ENGINE: Leo Daft, Greenville, N. J. Filed March 27, 1883.

289,896. ELECTRO-MAGNETIC BRAKE: Leo Daft, Greenville, N. J. Filed March 27, 1883.

289,897. CONDUCTOR FOR ELECTRIC RAILWAYS: Leo Daft, Greenville, N. J. Filed June 14, 1883.

289,898. CAR-COUPLING: James T. Dalton, Central Falls, R. I. Filed Oct. 3, 1882.

289,921. CAR-BRAKE: Hugh McCalip and Marshall M. Nye, Crawfordsville, Ind. Filed Aug. 23, 1883.

289,934. CAR-AXLE BOX: Fabian J. Roberts, Detroit, Mich., assignor of one-fourth to Henry A. Weber, same place. Filed Oct. 10, 1883.

289,953. AUTOMATIC RAILWAY-SIGNAL: Theophilus Arndt, Florin, assignor of one-half to Henry H. Heise, Columbia, Pa. Filed June 11, 1883.

289,970. CAR-BRAKE: William Brumble, Baltimore, Md. Filed Oct. 10, 1883.

289,977. REFRIGERATING-CAR: Warren A. Chase, Boston, Mass. Filed Sept. 29, 1883.

289,982. CAR-BRAKE: William Clayton, St. Louis, Mo. Filed Aug. 24, 1883.

289,985. CAR-COUPLING: David Pitkin Cory, Consecon, Ontario, Canada, assignor of one-half to Charles H. Osborne, Chicago, Ill. Filed July 2, 1883.

290,005. CAR-COUPLING: Michael J. Dougherty, Carbondale, Pa., assignor of one-half to John Burnett and Edward McHale, both of same place. Filed Oct. 3, 1883.

290,011. SPIKE-EXTRACTOR: John Ebbert, Rockaway Beach, N. Y., assignor to Philip A. Hall, Chicago, Ill. Filed May 5, 1883.

290,12. DEVICE FOR INCREASING THE TRACTION OF LOCOMOTIVES: Joseph Elder, Peoria, Ill. Filed Oct. 5, 1883.

290,041. VENTILATOR: David Groesbeck, New York, N. Y. Filed Oct. 5, 1881.

290,060. CAR-COUPLING: Dorsey P. Kahl, Lineville, Pa. Filed April 10, 1883.

290,086. CAR-COUPLING: Phineas E. Merrihew, Fairhaven, and Melville C. Poland and Edward F. Poland, Boston, Mass.; said Poland and Poland assignors to said Merrihew. Filed March 1, 1883.

290,097. CAR-COUPLING: Timothy C. O'Donovan, Walker's Mills, Pa. Filed June 28, 1883.

290,189. RAILWAY-CHAIR: August Ernst Mersiowsky, Myersdale, Pa., assignor of one-half to Nicholas Diedrich, Bloomington, Ill. Filed July 26, 1883.

290,194. SAFETY-SWITCH STAND: Geo. W. Horne, New York, N. Y. Filed June 12, 1883.

BEARING DATE DECEMBER 18, 1883.

290,209. RAILROAD-CHAIR: William P. Comstock, Jr., Pawtucket, R. I. Filed May 7, 1883.

290,241. DRAW-GEAR FOR RAILWAY-CARS: George Josephus Johnson and Eugene Howell Thomas, La Crosse, Wis. Filed Aug. 2, 1883.

290,243. CAR-COUPLING: John Rutherford Kirksey, Dysartville, N. C. Filed April 21, 1883.

290,269. AIR-BRAKE FOR CARS AND LOCOMOTIVES: Patrick Reilly, Mattoon, Ill. Filed Oct. 19, 1883.

290,276. CAR-COUPLING: Henry L. Shireman, Nazareth, Pa. Filed Sept. 27, 1883.

290,298. DUMPING-CAR: George J. Wheelock, Oakland, assignor of one-half to Napoleon Beauregard, San Francisco, Cal. Filed Sept. 28, 1883.

290,317. CAR-COUPLING: Clark E. Carr, Galesburg, Ill. Filed Oct. 5, 1883.

290,324. REFRIGERATOR-CAR: Theodore N. Ely and John W. Cloud, Altoona, Pa., and Edward B. Wall, Columbus, Ohio. Filed July 24, 1883.

290,330. CAR-COUPLING: Monroe Hunter, Attica, Ind. Filed July 12, 1883.

290,338. ELECTRIC RAILWAY-SIGNAL: George S. Maxwell, Louisville, Ky., assignor of one-half to Charles Knight Caron, same place. Filed Sept. 13, 1883.

290,344. ATTACHMENT FOR CAR-SEATS: Presley W. Morris, Ritchie Court House, W. Va. Filed Aug. 14, 1883.

290,356. CAR-BRAKE HANGER: John Rhoads, Philadelphia, Pa. Filed Oct. 25. 1883.

290,379. CAR-BRAKE: Lafayette Wilkerson, Scipio, Ind. Filed Oct. 31, 1883.

290,388. SIGNAL APPARATUS FOR RAILWAYS: Melville Cox Bragdon, Newton Highlands, Mass. Filed July 10, 1883.

290,391. TORPEDO-HOLDING ATTACHMENT FOR RAILWAY DANGER-SIGNALS: James A. Bonnell, New York, N. Y., assignor to the National Interlocking Switch and Signal Company, same place. Filed Feb. 9, 1883.

290,434. CAR-WHEEL: Adam Keil, Monongahela City, Pa. Filed Sept. 29, 1883.

290,452. CAR-COUPLING: Marcellus H. Merrill, New Lebanon Center, N. Y. Filed May 23, 1883.

290,516. PLATFORM FOR RAILROAD-CARS: Samuel M. Beery, Omaha, Nebr., assignor to himself and Isaac Mason Smith, same place. Filed Oct. 22, 1883.

290,518. CAR-WHEEL: Henry M. Boies, Scranton, Pa. Filed Oct. 10, 1883.

290,540. CAR-SIGNAL: George H. Cormack, Rockford, Ill. Filed June 4, 1883.

290,541. RAILROAD-CROSSING: John C. Coulter, Chesterton, Ind. Filed July 27, 1883.

290,542. LOCOMOTIVE-BOILER: Chas. B. Coventry, Chicago, Ill. Filed Nov. 7. 1883.

290,562. DEVICE FOR OPERATING STATION-INDICATORS: Samuel Forrester, Allegheny, Pa. Filed July 27, 1883.

290,569. CAR-COUPLING: Andrew J. George, Pulaski, and Thomas B. Turpin, Bloomfield, Iowa. Filed May 29, 1883.

290,582. CAR-SPRING: Chas. C. Hebbard, Knoxville, Tenn. Filed Oct. 13, 1883.

290,588. CAR-BRAKE: Alfred A. Lambrigger, Big Horn, Wyo. Filed May 4, 1883.

290,600. REFRIGERATING-CAR: Cassius C. Palmer, New York, N. Y. Filed Aug. 15, 1883.

290,602. RAILWAY-TELEGRAPH: William D. C. Pattyson, Marlborough, Mass., assignor of two-thirds to Horace S. Crowell and Edmund E. Bond, both of same place. Filed Jan. 22, 1883.

290,656. CAR COUPLING: Martin E. Swart, Denver, Colo. Filed Mar. 7, 1883.

BEARING DATE DECEMBER 25, 1883.

290,689. ELECTRO-MAGNETIC CAR-BRAKE: Richard Kampfe, Brooklyn, N. Y. Filed Sept. 14, 1882.

290,690. SEAL-LOCK FOR CAR-DOORS: Virgil A. Krepps, New York, N. Y. Filed Feb. 24, 1883.

290,703. RAILWAY HAND-CAR: John C. Perkins, Kalamazoo, Mich., assignor to George W. Miller and Horace G. Haines, both of same place. Filed Oct. 25, 1883.

290,710. VENTILATING CARS: Wm. Scott, Malden, Mass. Filed Mar. 13, 1883.

290,712. NUT-LOCK: Sumner Shaw, Boston, Mass. Filed May 2, 1883.

290,718. AUTOMATIC LOCOMOTIVE-WHISTLE ATTACHMENT: Jacob W. Strickle and Harry W. Manning, Huntsville, Ala. Filed Sept. 8, 1883.

299,720. CAR-STARTER: John A. True and Ebenezer Smith, Newburyport, Mass. Filed May 17, 1883.

290,723. AUTOMATIC CAR-BRAKE: Hanson S. Webster, Glensdale, assignor of two-thirds to John E. Mulford, New York, and Mortimer G. Lewis, Lowville, N. Y. Filed April 18, 1883.

290,746. SAFETY-FENDER FOR CARS: Patrick H. Cooney, San Francisco, Cal. Filed Sept. 11, 1883.

290,766. TIME-SIGNAL AND TRAIN-INDICATOR: Robert P. Garsed, Norristown, Pa. Filed Sept. 20, 1883.

290,770. RAILROAD-GUARD: Samuel Jefferson Gray, Fort Gratiot, Mich. Filed Sept. 19, 1883.

290,790. NUT-LOCK: Martin J. Nerney, Green Island, N. Y. Filed Nov. 1, 1883.

290,793. CROSS-TIE AND FASTENING FOR RAILROAD-RAILS: Lyman O. Orton, Philadelphia, Pa., assignor of one-fourth to Richard M. Popham, same place. Filed June 14, 1883.

290,842. RAILROAD-SIGNAL: Jonathan L. Booth, Rochester, N. Y. Filed March 23, 1883.

290,916. NUT-LOCK: Thomas M. O'Malley, Bellaire, Ohio, assignor of two-thirds to Arthur Gilmartin and John Deegan, both of same place. Filed Sept. 12, 1882.

290,924. CYLINDER-COCK STEAM-ESCAPE: John Harrson Porter, Jackson, Mich., assignor of one-half to John W. Twiggs, same place. Filed Oct. 26, 1883.

290,937. JOURNAL-LUBRICATOR: Martin L. Senderling, Jersey City, N. J. Filed Jan. 12, 1882.

290,938. CAR-AXLE: Francis P. Smith, Boston, Mass. Filed Oct. 15, 1883.

290,957. CAR-STEP: Horace S. Wolfe, Kalamazoo, Mich., assignor of three-fourths to William H. McCourtie and Chester Kellogg, same place. Filed May 26, 1883.

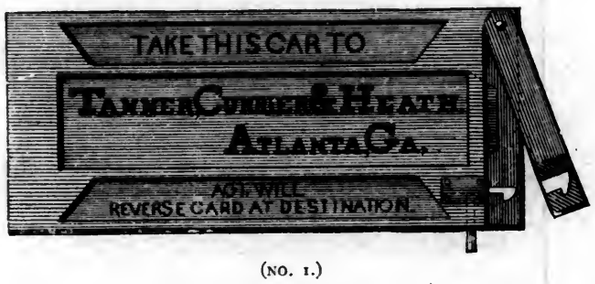
290,987. CAR-AXLE LUBRICATOR: Lyman D. Howard and Albert Chance, Philadelphia, Pa., assignors to the American Lubricating Company of New Jersey. Filed Sept. 21, 1882.

291,006. CAR-AXLE BOX: Peter Sweeney, New York, N. Y., assignor to James Augustus Hamilton, same place, individually and as trustee. Filed July 5, 1883.

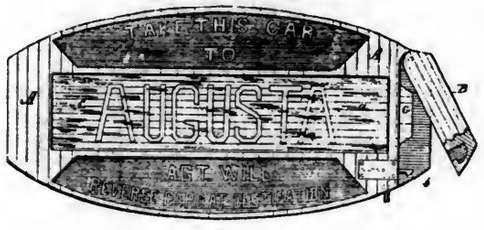
King's Express Card-Holder.

THE inventor of the device illustrated in the accompanying cuts, is Dr. Fred King, of Atlanta, Georgia, who is also the patentee and owner of the same.

The directions for using the holder are very simple. On one side of the card is printed the address of the consignee, on the other, that of the consignor. The former on receiving the package reverses and re-inserts the card when it is ready for re-shipment. The body of the holder is made of malleable iron, while the face or covering over the name is of transparent mica. Hence the holder is indestructible.



(NO. 1.)



(No. 2.)

No. 2 is for use on freight cars, doing away with waybills, freight slips, etc.. No. 1 costs eight and a half cents each; No. 2 about thirteen cents each. When, No. 2 being in use, the card is reversed, it is marked or addressed back to the road to which it belongs. Dr. King's invention, simple as it is useful, needs no further description than that conveyed by the cuts. We may add that the express companies give it their unsolicited indorsement.

A CORRESPONDENT writing to an exchange, asks, "Why don't some of our mechanical geniuses invent an automatic mechanical firing machine?"



New Sand Guard for Railways.

T. W. STAPLETON, of Portland, Oregon, is the inventor of the ingenious appliance described in the following paragraph. He was foreman on a Western railroad for several years, and when acting in that capacity, devised his guard to prevent the sand which is carried along by the wind from accumulating on the track. He tested it thoroughly on the road where he was employed, but not in as perfect a manner as that patented, because he was anxious to secure his patent before he would apply it as patented, lest he might lose the benefit of his invention. The great advantage derived from its use is that the stronger the wind blows the more sand will it remove from the sand hill, and in case there is little sand to be removed it will insure a clear track at all times, at a very slight cost of labor. The cost of applying the guard is nominal, and it will last a great number of years. It is claimed that one man can do more work with this appliance than a hundred could do without it. The patentee has assigned his invention to John G. McBride, Portland, Oregon.

Briefly described, it consists of a series of boards pivoted at the sides of the track and supporting other boards, under which the wind passes, sweeping over the track and carrying the sand along with it. The rails are spiked to ties, placed the usual distance apart, which rest on longitudinal beams supported on sleepers that are embedded in the ground, which must consist of gravel or some other earth that cannot be blown away. At the ends of some of the ties are loops for receiving hooks on the ends of boards, the free ends of which rest on rails placed at the side of the track and parallel with it. These rails rest on horses placed at right angles to the track, and at the ends are provided with downwardly projecting pins, one of which is on each side of the top piece of a horse. On these rails are boards hinged to the ties or fastened in any suitable manner. The free ends of the boards may rest on the ground, instead of on the rails supported by the horses. In sand storms the sand gathers in ridges on each side of the track, encroaches on the track, and finally stops travel. The horses are then placed on top of the ridges, and are pressed down until they have a firm bearing, when the rails and boards are placed on them, the latter having their outer edges a certain distance above the sand. The boards are so arranged that their outer edges will be toward the direction from which the sand blows. The wind passes under the boards, and is conducted to the other side of the track, carrying the sand with it. The boards need only be large enough to direct the current of wind so that it will have the desired effect, and they may be applied to either side of the track.

McCarthy's Improved Railway Switch and Crossing.

THIS invention relates to railway crossings and sidings. Its primary objects are first, to provide a siding or crossing without cutting the rails of the main track, and in the second place to provide an automatic siding whereby the train whether running upon the main track or the siding may pass the points of the junction without liability to derailing. It was put into practical use in the New London Northern Railroad yard at Palmer, Massachusetts, before a patent was applied for, and has been in successful operation for the past three months. The advantages claimed for it are, that it leaves the main track entire and unbroken, dispenses with the use of frogs and guard rails, thereby avoiding the causes which tend to loosen the wheels and allow them to run off the track after becoming loose. By its automatic working it is impossible to get a train off the track, whether the switch and crossings be set for the main or side track. The cost of manufacturing the entire device will be less than the cost of some frogs now in use. It is exceedingly durable, as the wheels do not come in contact with any part of it, except when moving it automatically from one position to another, or when using the siding. Should it be left wrong by mistake, or otherwise, no loss of life, or damage to rolling stock can occur, as the first passing train sets the track right again. It is claimed besides that by this new arrangement all jar and noise caused by trains passing through frogs, guard rails, and switches are avoided, and that trains can be sent over the road at a greater rate of speed without fear of a loose wheel or of a loose guard rail letting it off at the frog.

Further particulars can be procured from D. McCarthy, or P. J. O'Connor, of Norwich, Connecticut.

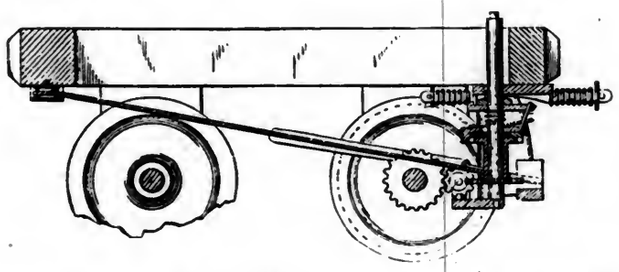
The Renouf Car Brake.

THE Renouf Car Brake is constructed on the principle of using the momentum of the car as the braking power.

George F. Renouf, Battle Creek, Michigan, the inventor, writes us that his brake is now in a shape to do its work on one or fifty cars, as it is applied to every car and is operated from the rear of the train, doing away with the danger of brakemen running over the train when it is covered with ice. Besides it is impossible at such a time, in case of extreme necessity, for the men to set sufficient

brakes to prevent accident. As Mr. Renouf is a practical railroad man, his opinion is entitled to weight, and when he claims for his brake that "it will do the work just as well as the air brake and is less likely to get out of order, is much less expensive, can be used on either passenger or freight cars, and furnishes its own power," sufficient reasons are given why the ground on which these great advantages are claimed should be examined.

The Renouf brake is geared from the axle, which operates it when in gear. Accompanying is a picture which, as assisted by a copy of the claim, will make the new device understood. The cut represents a longitudinal vertical sectional view of a car track, showing the new brake applied thereto.



The invention is (1) the combination, with the truck of a car, of the dependent frame, having journaled therein a vertical shaft, the gearing for rotating said shaft, the loose sleeve mounted on said shaft and connected to the brake beam by a rope or chain, and the mechanism for throwing the said sleeve into and out of gear with the shaft; (2) the combination, with the vertical shaft and the gearing for rotating the same, of the loose sleeve having a notched plate at its upper end, the guide plate secured to the shaft, the slotted plate having a lug at its lower side and an inclined pin on its upper side, the slotted guide plate and the vertically reciprocating plate having an aperture setting over the pin, the spiral spring and flat spring, and the slide beveled at its lower edge.

Improvement in Railroad Scales.

JOHN L. MERRILL, Pottstown, Pennsylvania, has invented an improvement in railroad scales, the object of which is to prevent the shocks that occur when a car is transferred from permanent rails to those on the platform of railroad scales.

In Mr. Merrill's invention the mechanism of the platform of an ordinary railroad scale is contained within a pit bounded by a quadrangular frame work composed of substantial end and side beams. The platform carrying rails are in line with but are necessarily detached from the rails of the permanent track; and the platform itself is supported entirely by the mechanism which determines the weight of a car and its contents. In order that the proper action of the scales may always be assured, gaps are provided between the ends of the rails of the platform and the ends of the permanent rails. When a car is transferred from the rails of the permanent track to those of the platform, severe shocks must always occur at the time when the wheels cross the said gaps between the rails, and these shocks must necessarily have a deteriorating effect on the weighing mechanism beneath the platform. In order to obviate this evil, Mr. Merrill bridges the gaps by extending the rails of the platform beyond the ends of the same, and beveling the extension to coincide with the beveled ends of the fixed rails. These projecting ends of the rails are never in contact either with the fixed frame by which the pit is bounded, or with the permanent rails, because the beam of the frame, to which is secured the permanent rail, is cut away beneath the projecting beveled end of the platform rail, so that when the platform is slightly depressed on receiving a loaded car, there can be no fear of the projecting ends of the rails coming in contact with the fixed frame. There is also a space of a quarter of an inch, or thereabout, between the beveled end of each platform rail and the beveled end of the adjoining fixed rail, so as to permit the slight longitudinal play of the platform which takes place when a car is transferred from the main rails to the platform rails. When the tread of a car wheel first comes into contact with the projecting end of the platform rail it is not free from contact with the permanent rail, and hence the transfer of a car from the permanent rails to those of the platform is accomplished without the shocks attending the transfer of the car on to the ordinary platform. In order to strengthen the projecting ends of the rail, Mr. Merrill secures to it a bar similar to an ordinary splicing bar; or there may be of such bars, one on each side of the rail.

Ball's Station Indicator.

THIS device, by Charles O. Ball, of Lowell, Massachusetts, is designed to obviate the necessity of having the brakeman or conductor enter the car at every station to announce the same to passengers.

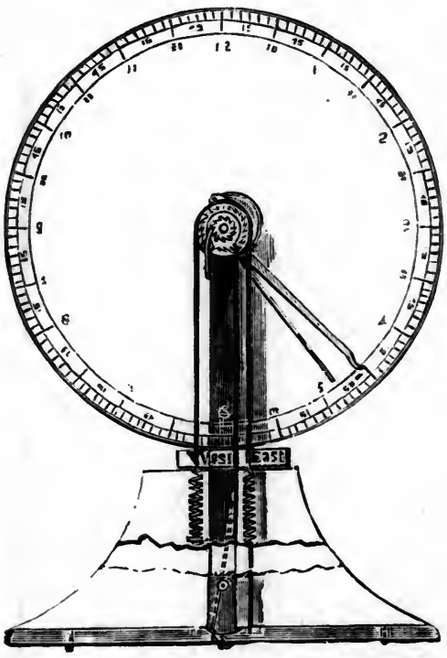
The exterior of the Ball Station Indicator consists of a case with a glass window or face large enough to exhibit the name of one station at a time; the interior contains two rollers, with a small gear at the end of each. These gears are rotated by coming in contact with a larger wheel, which in turn is rotated by means of a small ratchet and pawl. A wire or cord is attached to the pawl,



and passes through the car in a manner similar to the bell cord; and is attached to the pawl of the indicator at the other end of the car, and also passes through the end of the car to the outside, to which may be affixed a handle or knob of any kind. Thus, by pulling the cord from either end of the car, the names will both be changed at once without the necessity of entering the car. It may also be operated by a spring, if desired, which fact is stated in the specification. The names along the route are printed on a roll of tough paper or other material, and wound around the rollers. If a car goes back over the same route, all that will be necessary will be to move a small handle or pin, and the rollers will turn in the

opposite direction. After the wire has been pulled, it is brought back to its original position by means of a spring. If the car is to go over more than one rail road, the rollers containing the names can be removed, and others belonging to the new road substituted. The number of miles to the different places can be printed on the same slip with the names. As soon as the train leaves a station, the cord is to be pulled, and a small bell or gong is struck at the same time to attract the attention of passengers to the change of names, in order that they may have their small bundles and parcels ready to leave the car as soon as it stops. It may also be used to announce a change of cars. The advantages consist in changing the names in both ends of the car at once, and having but one cord pass through the car, and also in making no difference from which end of the car the cord is pulled. The interior parts can be made for three or four dollars, but the cost of the case would depend on its elaborateness. Further information may be obtained of the American Patent Agency, Nos. 188 and 190 Fifth Street, Cincinnati, Ohio, or of C. O. Ball, Lowell, Massachusetts.

Railway Time Signal.



EATHERTON & THOMPSON, Monticello, Piatt Co., Ills., are the patentees of an apparatus enabling fast trains to show a time-table at way stations and between stations at a long distance from each other. It consists of a clock dial divided into hours, minutes and seconds, and which has a time hand having a projection on its outer side near the end. A short shaft is journaled in a bearing at the top of an upright concentric with the clock dial, and an indicator hand is fastened upon the inner ends. A ratchet-wheel is fastened upon the outer end of the shaft, and is engaged by a pawl fastened upon the upright. The inclination of the teeth allowing the shaft and hand to turn in the same direction as the clock hand, a pulley around which a cord is wound, turns loosely upon the shaft, and when turned in the direction of the clock hand, a spring pawl engages the teeth of a ratchet wheel and turns it. When the ratchet wheel is revolved, the shaft and the indicator hand are turned until the latter strikes the projection upon the hand, when it remains stationary, allowing the pulley and wheel to turn further around. One end of the cord is fastened to a coil spring, and its other end to a lever which is operated by a movable rail or press bar at the side of the road rail. This rail has two vertical perforations for two upright rods to project into; and around these are wound two spiral springs which rest upon the bar frame and bar, with their upper ends against the under side of the bar.

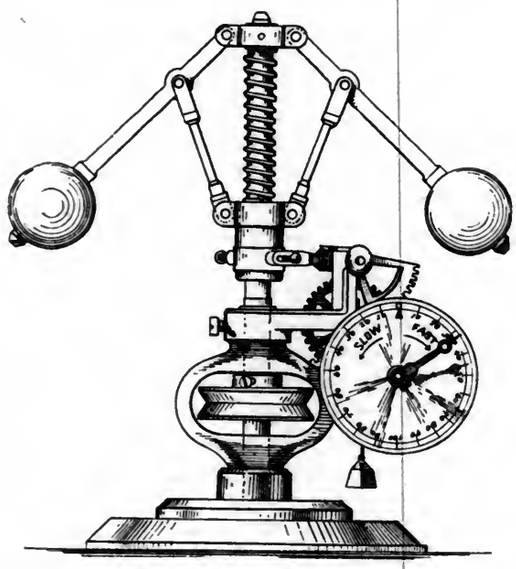
When a train passes, the rail (or bar) is depressed, setting the mechanism, and the spiral spring causes the indicator to revolve with the rise of the bar striking on the projection of the time hand, correctly indicating the time the train moved off the bar. To indicate the direction in which a train passed, a card case is fastened upon the end of an arm, and the card used to denote the direction of the road, east, west, etc. The lower end is fastened upon a crank, and has upon its either end another crank, which projects upward into a notch in the rail or bar, and is tilted by the flanges of the car wheels as they pass over it; which again tilts the arm and throws that card to view which bears the direction of the train.

A New Nut Lock.

RAILROAD men in Troy, New York and vicinity are much interested in a new nut lock, the invention of Mr. J. Nerney, of Green Island, New York. It consists of a washer having on its outer face or surface, four raised lugs, to form a nut seat for any ordinary nut, said washer having besides on its periphery a series of cog teeth of an equilateral triangle shape, so closely connected as to secure a lock at each short turn of the nut. The front end of the pawl is weighted and provided with a notch to fit approximately between the engaging teeth of the washer, while the other or pivoted end of the pawl is riveted to the fish plate. When the nut and washer are screwed home on the plate, the broad head of the rivet (after the pawl is dropped into place between the teeth of the washer), is hammered and impinged to the end of the pawl, thereby preventing the same from rebounding out of place during the shock or vibration of passing trains. We are informed that the device described was placed on the Troy Union track, north of the depot, last April, and notwithstanding the fact that one hundred and forty trains a day passed over it on a loose yielding tie, it has not permitted the nut to turn backward a single thread on the bolt. It has become absolutely cemented to the plate, and no shock or percussion of the wheels is sufficient to displace it. By the application of a wrench, however, and a slight turn of the nut forward, the lower engaging tooth starts the pawl upward, when the nut and washer may be instantly removed from the bolt.

THE railroad ticket press and holder for card tickets, invented by John Loudon, Big Rapids, Michigan, consists of a frame large enough to admit a bunch of card tickets, and just wide enough for the ticket, with a screw running the whole length of it with a plate, same as in the letter press, with a groove in it also at bottom of frame to admit of a string to go around the tickets.

Blanchard's Speed Indicator.



THE above cut illustrates a small but reliable piece of mechanism, designed to supply a long-felt want in our various manufacturing establishments, viz.: something that would at all times show with certainty, whether the shafting, machinery, engine, etc., is running at the proper speed.

Manufacturers and mechanics well understand how desirable it is to have their machinery run at a certain speed, both for economy and effectiveness.

The device consists of a small "Ball Governor" and dial, with suitable mechanism for moving the hand or pointer, according as the balls are lifted or lowered by the speed imparted to them by the shaft or machinery to which it may be belted.

So long as the proper speed is maintained, the hand will point at O, but any deviation will instantly be shown by the hand moving to "fast" or "slow" as the case may be.

Being portable, and needing but a small band to drive it, it can be put in any desired position and is always ready, like a clock, to show at a glance at just what speed the machinery is running.

Manufacturers, engineers and overseers who have seen it, speak very highly of it, and several parties have ordered a number of them, so as to place one in each room of their factories. It has been patented in the United States and Canada, and will no doubt meet with large and rapid sales.

For further information, State rights, etc., interested parties can address the inventor, Thomas Blanchard, Stoughton, Massachusetts.

New Improvement in "Block" Signaling.

THE railway signal devised by George F. Carlile, of Bloomington, Illinois, upon which letters patent were issued from Washington December 4, 1883, is an invention of more than ordinary importance. Advantages claimed for it are simplicity and cheapness, durability and adaptability to all places where signals are used. In operating it, any kind of illuminating substance can be used, and the number of signals which can be displayed from one signal is unlimited. It provides that the light displayed does not move, but is perfectly steady, being protected absolutely from the weather. Moreover, the glasses are protected against dirt. Any number of tracks can be operated by one signal. Day signals, by Mr. Carlile's system, are made to stand either horizontally or perpendicularly, as may be desired.

As indicated in the title of this article, the invention relates to that class of signaling devices known as the "block" system for governing the movement of trains, the road being divided into sections and the signal apparatus being so placed as to control each section in regular order.

The apparatus is a combination, with an outer inclosing rectangular case, provided with transparent openings at the lower end and a cap and escape tube at the upper end, of a rectangular metallic flue arranged centrally on the inside of said case, this flue being provided with corresponding openings and forming a receptacle for a stationary lamp, and square signal boxes arranged one within the other, inclosing the flue, and adapted to have a vertical movement on the interior of the above-mentioned inclosing rectangular case. Combined with this case are also signal boards adapted to have a vertical movement within it, and provided with the before-mentioned square signal boxes on their upper inner ends. The signal boards are adapted to project from the lower end of the inclosing case in a vertical plane, and the square signal boxes are secured to the interior upper ends of the signal boards and adapted to move simultaneously with them. These signal boxes are open at the top and bottom, and arranged to have an independent adjustment relative to each other for the purpose of displaying different signals. Completing the apparatus are operating cords, cross bars, sheaves, and brackets necessary to operate the differently-colored signal boards in their relations with the signal boxes.

Inquiries regarding his invention addressed to Mr. Carlile, will be promptly answered.

Draw-Gear for Railway Cars.

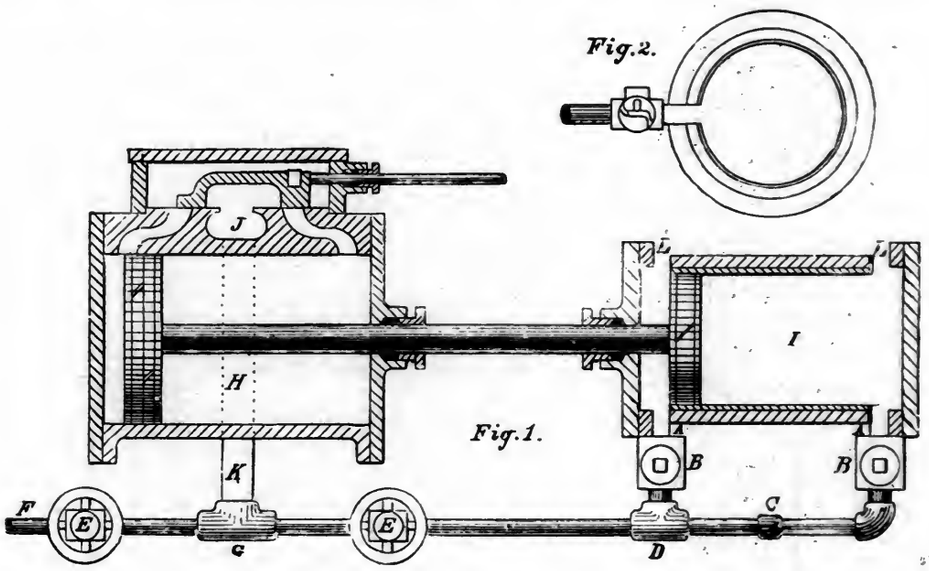
AN invention of George Josephus Johnson and Eugene Howell Thomas, of La Crosse, Wisconsin, provides a new means of preventing the withdrawal of draw-bars for coupling cars together. The patentees claim that by its use all danger of the draw bar becoming disconnected from its position is averted. The several parts of this device constituting the means by which draw-bars connecting cars together are prevented from being pulled or drawn out, may be made of any material found suitable, such, for instance, as steel, brass, wrought or cast iron, and the like. They are described in detail in the specification forming part of letters patent No. 290,241.

ALBERT H. GLEASON, of Wabash, Indiana, has invented and patented a light-running and almost noiseless rotary engine. It has a skeleton piston of minimum weight, and its lever power is preserved at a maximum. The engine has but two slides, each with an independent action. Its inlet and exhaust ports are close together, enabling the pressure of a given amount of steam to be utilized for a greater length than can be done in rotary engines where the inlet and exhaust ports are at a greater distance apart.

Utilizing the Exhaust of Steam Pipes.

MESSRS. ROBIE AND LYONS, of Portsmouth, Virginia, have patented the means of accomplishing this result. We append a description and illustrate the process of their invention.

In the above sketch, Fig. 1 represents a horizontal section of a double-acting steam pump, with the invention for utilizing the exhaust steam attached. Fig. 2 is a vertical section of one end of the pump cylinder, showing position of the check valve, opening into the cylinder. In Fig. 1 the exhaust pipe K, from the steam cylinder, branches at G, one branch extending to D, and the other to the atmosphere. Both of these branches are fitted with stop valves E E. At D the exhaust branches into each end of the pump cylinder, and in these branches are placed the check valves B B, with their delivery opening into the pump cylinder. In operating a pump with this



invention attached, close the low pressure valve E, between G and D, and open the high pressure valve E, leading to the atmosphere. After admitting steam and working the pump a few strokes, to get the current of water fully established, partially close the high pressure valve E, and while opening the low pressure valve E, finish closing the other. The pump will then be working low pressure. Suppose the pump to be, as shown in sketch, on its center, then the pump cylinder I, will be partially full of water, lying in a vacuum, produced by the stroke of the piston. At this time the steam in the cylinder H, which has forced the piston to the end of the stroke, commences to exhaust, and it passes into the pump cylinder through the check valve B, opening into I, and is instantly condensed by contact with the water in the pump. When the piston commences its return stroke, as soon as the water is compressed in I the check valve at B is closed by the pressure on top of it, and the vacuum formed at the other end of the cylinder allows any uncondensed vapor remaining in the exhaust pipe to pass through check valve B, leading into the pump at A. The advantages gained by using this invention are evident to any one acquainted with steam. When used for feeding boilers, the pump is as economical as an inspirator, for the heat required to give the necessary power to work the pump is returned directly to the boiler through the feed water, giving a higher temperature to the same, and preventing the injurious effects of the feed water entering the boiler cold. By actual test before an examining board, water was taken into the pump at 45° and discharged from the pump into the boiler at 145°, making a gain of 100° of heat by using the invention of Robie and Lyons. This invention is also very important when attached to pumps used for pumping water into tanks at railroad stations. To illustrate: Suppose the pump is taking water at a distance of 20 feet below it. In this case the pump would have to form a vacuum of 25 feet at least to produce a sufficient flow of water into the pump. The exhaust then from the steam cylinder has a ready formed vacuum of 25 feet to exhaust into, which will give an extra pressure on the steam piston of about 12 pounds per square inch, due to atmospheric pressure, and this extra pressure gives a large percentage of gain in power, produced by attaching this invention. Again, in the North and West, in the winter, the water often freezes in the pipes. This can be entirely prevented by running the pump slow and heating the water to a high temperature before it leaves the pump. This invention can be readily attached to the different kinds of steam pumps by simply tapping a nipple of the desired size into each end of the pump, avoiding the lining of the pump, and connecting check valves and exhaust. By closing the low pressure valve and opening the high pressure, the pump will work in the ordinary manner.

THE estimated savings of the Chesapeake and Ohio Railroad for December, 1883, were $324,527.24, an increase of $71,171.52 over December, 1882; estimated earnings from January 1 to December 31, 1883, $3,924,934.30, an increase of $589,957.29 over 1882. The estimated earnings of the Elizabethtown, Lexington and Big Sandy Railroad for December, 1883, were $52.695.14, an increase of $5,604-.93 over earnings in December, 1882. During the year 1883, the road earned $714,267.96, an increase of $184,-949.25 over the amount earned in 1882.

Track-Laying Machine.

FULL details of the new track-laying machine invented by Ferdinand F. Voigt, of Walla Walla, Washington Territory, have been sent to this office. We have not the space necessary to their publication to spare, and refer our readers to the patentee for particulars. All we can say is, that Mr. Voigt's invention relates to the class of track-laying machines in which a peculiar car, provided with the necessary apparatus for handling the material, is joined to and made to precede a construction train carrying the material. It consists in a novel means for carrying the material to the front, in a novel means for handling the cross ties and rails, in a novel means for switching the material trucks to avoid interference, and in certain other details of construction. The object of the invention is to lay a railroad track with facility and dispatch, thereby economizing time and labor.

The Gibbon Boltless Rail Joint.

THE above cut needs no explanation on our part. It is a comprehensive view of a Boltless Rail Joint recently invented by T. H. Gibbon, Esq., lately assistant engineer of the D. & H. C. Co.

The following scientific tests which have been tabulated for us, fully illustrate the great strength of the Joint, showing it to be even stronger than the rail itself, and also to possess uniform elasticity (so necessary to easy and safe travel) from the lightest truck to the heaviest locomotive.

The Joint has been severely tested in the track of the D. & H. C. Co. for five months without any work performed on that portion of the track, and it is estimated that three hundred engines with their cars pass over them every day.

The following results are fully demonstrated:

1. It makes a smooth and continuous track.

2. It removes the possibility of low joints. (The track is as level as when first laid).

3. The track can neither spread nor creep, and any amount can be given for expansion.

4. This joint removes all labor of raising low joints and screwing up loose bolts.

5. The spikes are as firm as when first driven.

6. Two miles of track can be laid with this joint quicker than one mile with any other joint.

7. A broken rail can be spliced with this joint in twenty minutes, with two men, maul, and chisel.

8. The strongest and cheapest joint manufactured, besides saving about 1500 lbs. of steel to every mile when purchasing rails at mill.

9. Mr. Thomas H. Gibbon, lately assistant engineer of the above-named company, has had fourteen years' experience in roll mills as inspector of steel rails for the D. & H. C. Co., and he finds that the rails can be cut for this joint by simply placing two additional saws on the same collar, which will cut the head of the rail at the same time as the ends. The punching machine which is now used for slotting the flange of the rails for the spikes, is used for taking the head of the rail off, thus saving time and avoiding the weakening of rails by drilling for bolts and nuts.

RESULTS OF EXPERIMENTS OF THE GIBBON BOLTLESS RAIL JOINT.

Messrs. Fairbanks & Co., Dept. of Tests and Experiments, New York, A. V. Abbott, Esq., Engineer in charge.

To ascertain the resistance to Deflection and Rupture, under a gradually increased bending Stress.

Nov. 20th, 1883.

Test No.	Weight of Joint.	Gauge Set.	Stress in lbs.	Deflection in inches and decimal of inches.										Ultimate. Stress. lbs.	Span in inches.	Remarks.
		1,000	5,000	10,000	15,000	20,000	25,000	30,000	35,000	37,600	40,000	45,000	50,000			
449.	23 lbs.		.100	.200	.287	.335	.525	.600	.810	Casting cracked and pressure amounted to.....				42,700	28	Revealing blow-holes in casting.
487A	29 lbs.		.102	.180	.228	.300	.410	.540	.625	.720	.825	.965	1.040	75,000	Tie in Sand.	No sign of failure of joint.
487B	29 lbs.		.150	.300	.335	.425	.475	.550	.600	.800	Gauge removed and pressure increased to.....			66,500	20	When joint cracked slightly.
488A	29 lbs.		.155	.267	.330	.390	.465	.530	.550	.600	.625	.656	.700	104,000	20	* Test discontinued, no failure of joint. *No tie under the joint. Joint failed, by tearing the bottom of the rail from the web, and by cracking both rails through the head at a distance of 17½ inches.
488B	29 lbs.		.125	.225	.330	.440	.530	.620	.666	.765	.875	1,020	1.175	67,090	40 Span.	
														4)280,290		
														70,072 lbs.		
														As a suspended joint.....		
Steel Rails 62 lbs. pr yd																
489			.160	.200	.230	.280	.320	.450	1.020	2.350	Gauge removed and pressure increased to.....			42,550	40 Span.	Rail completely failed.

*Thus proving the Joint strengthens the Rail 25,000 lbs. at its weakest part, viz., the Joint.

CONCLUSIONS OF A. V. ABBOTT'S REPORT.

The heaviest locomotives of the present day rarely, if ever, are built to give a load of more than 10,000 lbs. on a

single driver. If this load be doubled to allow for a severe case of impact, due to high speeds, a load of 20,000 lbs. is obtained as the maximum stress that can be placed on a rail joint at any time.

An inspection of the foregoing tests gives the following factors of safety under different conditions in the case of the Gibbon Joint, used as a suspended joint, with the ties placed twenty inches apart. A load of 104,000 lbs. (fifty-two tons) was sustained without any signs of failure of the joint, thus giving a factor of over 5. (Test discontinued).

In experiment 487, with ties set twenty inches apart, and the middle tie support on a yielding foundation of sand, a load of 75,000 lbs. was supported without failure, giving a factor of nearly 4. (Test discontinued).

In experiment 488 B. The joint with a span of forty inches (no tie under the joint) failed under a load of 67,090 lbs., giving a factor of over 3, under circumstances as unfavorable to the joint as may be supposed to occur when the ballast of the track has been washed away from the ties adjacent to the joint.

Furthermore, in this test, the rails themselves failed at the same time as the joint, showing that under such circumstances, at least, the joint was as strong as the rest of the track.

From the above conclusions it may be safely asserted that the Gibbon Joint is strong enough to do all the work that may be expected from a railway splice, under even very adverse circumstances.

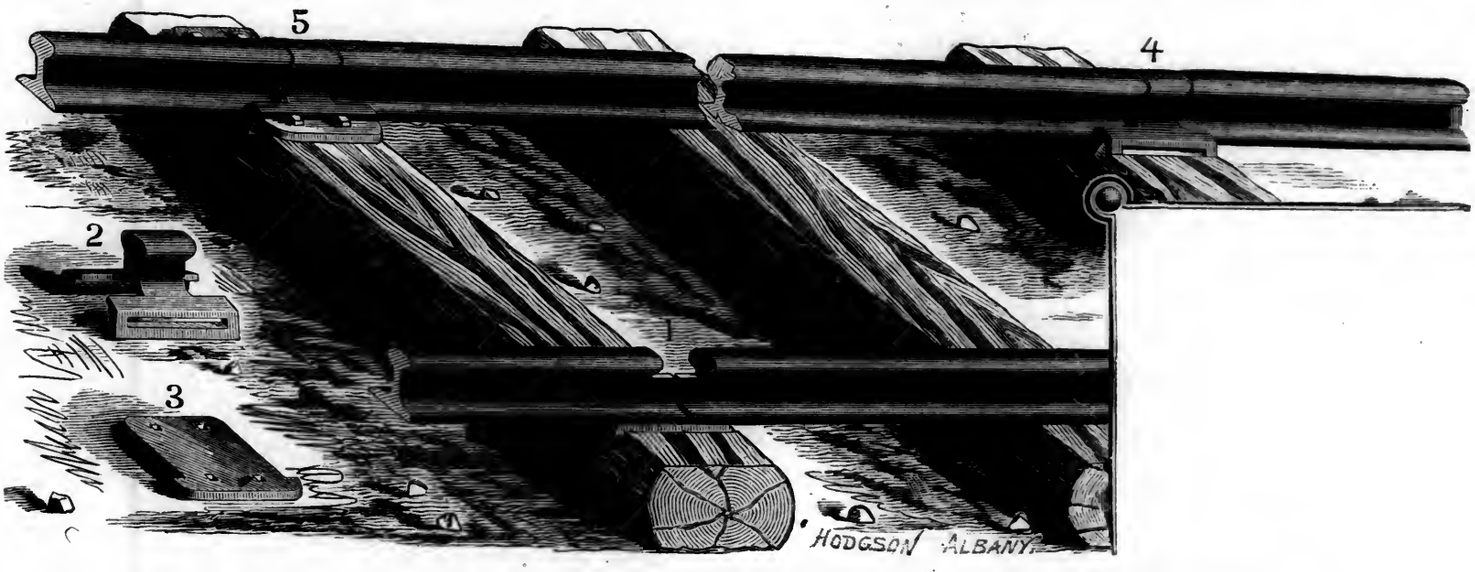
The steel castings that were used in these tests were remarkably soft and ductile, so that there need be no apprehension that such castings would wear unequally with the rails.

The joint, therefore, would seem to be eminently adapted to do the work for which it was designed, and to obviate many of the objections to the present systems.

Grate Bar for Locomotives.

THE objects of the grate bar for locomotives, recently patented by Isaac W. Swallow, of Kingston, Pennsylvania, are to produce a grate for locomotive engines, which, while serving as a grate, may at the same time be operated to clean and remove the ashes from the bottom of the fire without injuring or weakening it, and without the necessity of opening the fire box, and while the engine is raising steam, thus preventing a wasting of the volume of heat in the furnace, and a reduction of the amount of steam while cleaning and renewing the fire; in so arranging the tumbler-bars that the fire may be cleaned along the side walls and in the corners as well as in the middle of the fire box, thereby enabling the operator to keep the fire at the sides and corners in the same condition as in the middle, which is of great importance from the fact that there is where the greatest amount of steam is generated, because nearer to the water pipes, and the place under the present system where the fire dies out first and is the most difficult to renew.

It is briefly described to be a fire grate for the fire boxes of locomotives, consisting of a series of water bars

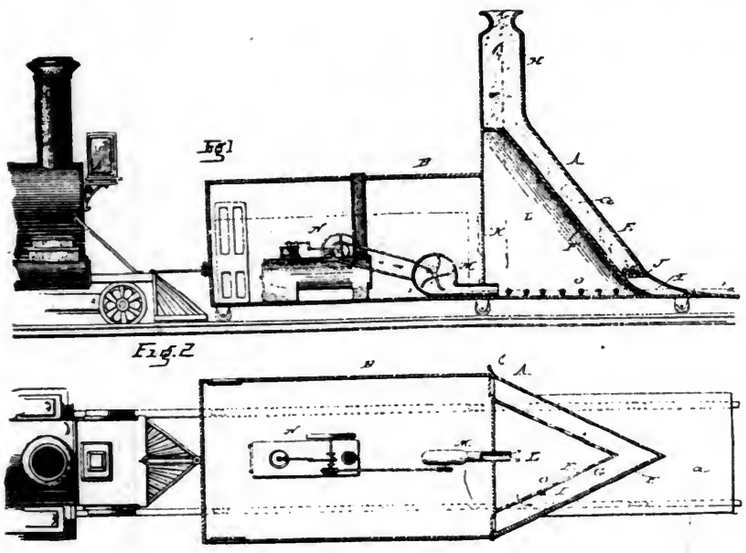


and movable tumbler bars extending longitudinally of the fire box beside and parallel with the water bars, and arranged to be operated from the exterior of the fire box by a shaking-rod, and its connections to raise and lower said tumbler bars on curvilinear lines, and thereby remove the ashes from the bottom of the fire, from its sides, corners and middle.

The construction of this grate bar is so arranged that in case any part becomes worn out or broken it will take but a few minutes' work to replace it with a new one, as it is only necessary to take off two or three nuts and remove the bolts to get out any part of the several pieces. The fire can be stirred or cleaned while the locomotive is in motion without reducing the amount of steam, as the whole operation is performed in a few minutes by the use of the shaking-lever. It saves the furnace man or operator from a great deal of exposure to the fire, because it dispenses with the necessity of opening the door of the fire box, except to add fuel. It will work in hard or soft coal burners, and will save fuel, because it removes the ashes only, and saves the good fire and unburned coal.

Particulars as to the cost of the new grate bar, etc., are procurable from the inventor and patentee.

FORTUNE often rewards with interest those that have patience to wait for her.



The Dawson Snow-Plow.

THE above cuts show an entirely new and different plan of operating against snow on railroads. In this invention the calculation is to have the plow come in contact with the snow by gradually pushing it into the bank by the locomotive. The square shovel at the extreme point almost touches the rails, but is kept from actual contact by shoes at each rail. These are not so large as to allow of any great amount of snow remaining on the rails. The plow proper is wider than the tender or cars, allowing a wide enough track for cars to pass through, after the same has been melted by the plow. The plan of melting snow is an entirely new one, and must be effective for the reason that when snow is once reduced to water, it cannot possibly again give trouble by drifting back on the track. The only objection which has occurred to the inventor that can be said against his plan and its mode of operation is, that the water made by the melted snow may, in deep cuts, form ice at the rails. This, however, can be overcome by having a receptacle at each of the outside rear corners, under the plow at c c, Fig. 2, for the purpose of catching the water, to which may be attached a pump operated by the small engine on the plow tender. By this means the water may either be pumped into the tank of the tender, or forced far enough from the track as not to cause an obstruction. The plow is calculated to be made of the very heaviest of boiler iron, or cast, as engineers may determine; and of course will be so heavy, when fixed up, that there will be no danger of its jumping the track when running at a good speed where there is no snow to melt. Where there is work for the plow to do, it is to be pushed in as fast as the snow will melt, and this may be regulated by the amount of fire put into the receptacle. There is plenty of space for this purpose, the calculation being to have not less than twenty-four inches of space between the air chamber and the outer wall of the plow for fuel. This space extends to the top of the plow, at the smoke stack, back to the rear, where the tender or fan is located. There can be no limit to the amount of heat, as the operator of the plow can keep the fan blast at as high rate of speed as he wishes, and can use any kind of fuel he sees fit.

In case the plow is not needed, after going through a large drift, it can be damped down. As the inner chamber is perfectly air-tight after the doors are shut, and blast is shut off, there cannot be any possibility of getting this plow stuck in a snow bank, for should the fire not be sufficient to melt the snow, and should it become packed in front of the plow, by remaining still for awhile and putting on more blast, it would soon free itself. The tender of the plow is constructed to carry coal for both the plow and stationary engine, and also a water tank for the stationary engine.

The snow plow above described is for sale by E. C. Dawson, Maquoketa, Iowa.

The Railway Switch.

IN the superstructure of the road-bed of a railroad, there is, perhaps, no part of more vital importance than the switch, as upon it depends, to a great extent, the safety of train property and the lives of travelers. It is, therefore, prudent, and certainly economical, that such switches should be used as will prevent loss of life and property.

Many railroads use switches which always leave open tracks, that are constantly liable to cause loss by trains running through them. Misplaced switches are chronicled frequently as the cause of trains running off the track. These events are called accidents when, really, accident has nothing to do with them. Neglect, and neglect only, is the cause of them. The switchman, though humble in position, occupies a very responsible station, for on his faithfulness also depends to a great degree, the lives of travelers and the property of railroads, and it is necessary that good and trustworthy men should be employed for the purpose; but, however good and faithful a switchman may be, there is a possibility that, from some want of care, loss will be caused. It is not only prudent, but it is positively necessary that this possibility should be guarded.

A new switch invented by John T. Rigney, of Baltimore, Maryland, is described as one over which trains can run without the fear of getting off the track in consequence of its being misplaced or the track being open. This device is placed in one side of the track only and consists of a main rail which forms a part of the track. On the outside of this rail, and parallel with it, is a protection or safety rail which meets and forms a connection with the siding rail. On the inner side is a pointed rail or frog point equidistant from the main rail with protection rail, and a guard rail extending from a little beyond the point of the frog to or beyond the heel end of the switch, where is a pivot in the main rail on which the switch is turned. All these parts are securely fastened together by spacing pieces and bolts. When the switch is turned for the siding, the main rail takes the place of the protection rail and fits to the siding rail, and the frog point fits to the main rail and forms a direct line with it. Opposite the switch, the other side of the track is securely fastened down. The rail of the siding is pointed and also fastened, the point being placed at about opposite that of the frog point of the switch. A guard rail is also used here, extending from a distance beyond or parallel with the head of the switch. These parts form a frog opposite the switch with broken joints so as to prevent the churning of cross ties, which is often produced when joints are opposite on the same tie.

This side of the track is the guide of all wheels passing over the switch in the opposite direction and controls their course, so that when the switch is fixed for the main track, if a car should run down the siding, the wheels on the switch side will gradually rise on the protection rail until the flanges pass over and the wheels drop and continue on the main track; and, when the switch is set for the siding, if a car should run down the main track in the opposite direction, the wheels on the switch side will run over the frog point (the flanges pass between it and the guard rail) and continues on the main track.

Mr. Rigney has, in connection with his switch for one track, arranged it for three or more tracks upon the same principle, putting one in each side of the track. For three tracks the switch has two protection rails on the outside and two frog points and a guard rail inside. In this way he protects all the tracks at all times, and cars must continue on the track in whatever position the switch may occupy. This is a great feature, as many double switches now in use leave two open tracks on each side.

The Rutter Refrigerator Car.

THIS improvement, invented by Levi Rutter, of Newmanstown, Pennsylvania, provides in a refrigerator car, a bottom with slits and inclined plates below said slits. The walls of the ice receptacle form with the inclined plates, a double check for the water. Below the slits and inclined plates are inclined troughs having curled edges and provided with a waste pipe coiled in the car; also with exhaust pipes operated by the movement of the car, and withdrawing air at or near the bottom of the car, which is closed.

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THE LAKE SHORE RAILROAD COMPANY,
TREASURER'S OFFICE, GRAND CENTRAL DEPOT,
NEW YORK, Dec. 26, 1883.

THE BOARD OF DIRECTORS of this company have this day declared a Quarterly Dividend of two per cent. upon its capital stock, payable on FRIDAY, the first day of February next, at this office.

The Treasurer's Books will be closed at 3 o'clock, P. M., on Monday, the 31st inst., and will be reopened on the morning of Tuesday, the 5th day of February next. E. D. WORCESTER, Treasurer.

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and others subject to the constant jar of the cars, who find themselves becoming nervous, with weakness of the kidneys, etc.; travelers and others exposed to sudden changes of temperature and climates, and who are liable to coughs, colds, lung complaints, rheumatism, malaria, and contagious diseases, will not only find our Magnetic Belt a CURATIVE but also preventive of these ills. They keep the blood pure, rich, and healthful, by giving it iron, magnetism and electricity—which are the life of it, as well as imparting tone and vigor to the nerves and strength and hardness to the muscles—thus keeping the system in its normal, healthful condition.

READ THE EVIDENCE.

CHICAGO, ILL., Nov. 7, 1883.

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GENTLEMEN:—I am prompted to make this public acknowledgment of the wonderful merits and curative properties of your Magnetic Belts, from the great relief and benefit obtained by using one for the past year. If any class of people suffer from kidney disease it is railroad engineers, occasioned by the continual jar of the engine. I have suffered many years with Kidney and Liver disease, Rheumatism, and great exhaustion and nervousness. Now I feel like a new man, so great is the change in my health. I doctored with some of the best physicians during those years, who dosed and drugged but did not cure me; but I am free to state that your Magnetic Belt is the best and cheapest curative agent in America. I feel like a new being in every respect, and I shall use my influence in behalf of your admirable Appliances. I wish every railroad engineer in America that is troubled as I have been, would try your belt.

Yours truly, H. L. SEAVER,
Engineer Illinois Central R. R.
Residence, 1228 Indiana Ave.

CHICAGO, ILL., Jan. 24, 1883.

To Whom it may concern:

Up to within four months ago, I have spent upwards of fifteen hundred dollars in trying to cure myself of rheumatism. I have made trips to the Hot Springs and different resorts throughout the country, all of which furnished me no relief. Four years ago I purchased a Belt, Lung Protector and Insoles from the Magneton Appliance Company, and have not had any rheumatism since wearing the appliances, which is the first time in five years I have been free from it.

Yours truly,
J. P. PUTNAM, Conductor I. C. R. R.

P. S.—Mr. Putnam is conductor on the Illinois Central Railroad, which position he has filled the past fifteen years.

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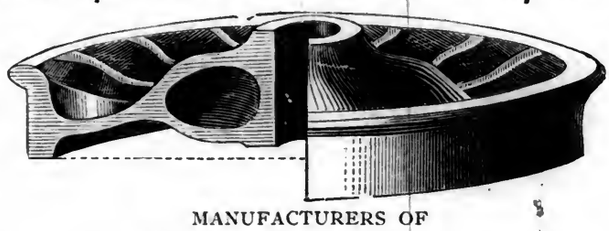
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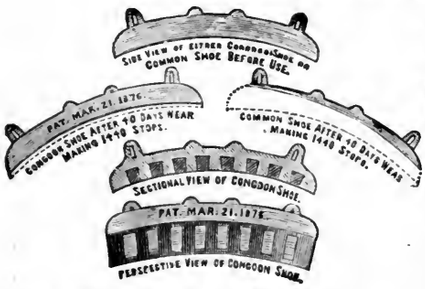
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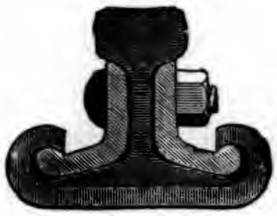
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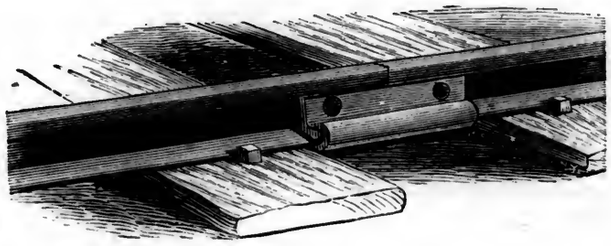
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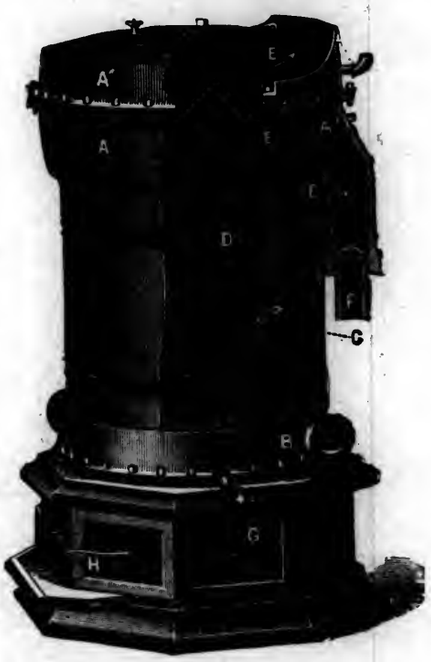
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American Institute, of the City of New-York, - - - - - - - - - 1859-1870
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Maryland Institute for the Protection of Mechanic Arts, - - - - - - - - 1873
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Massachusetts Charitable Mechanics Association, Boston, - - - - - - 1860
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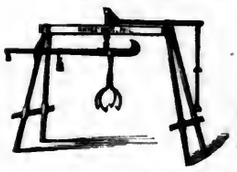
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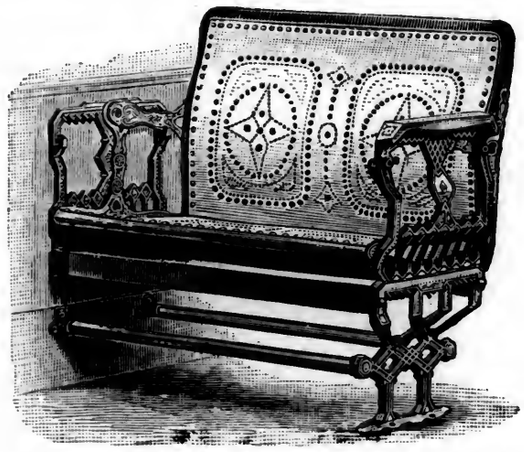
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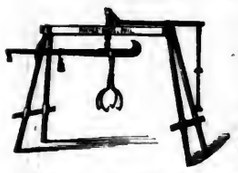
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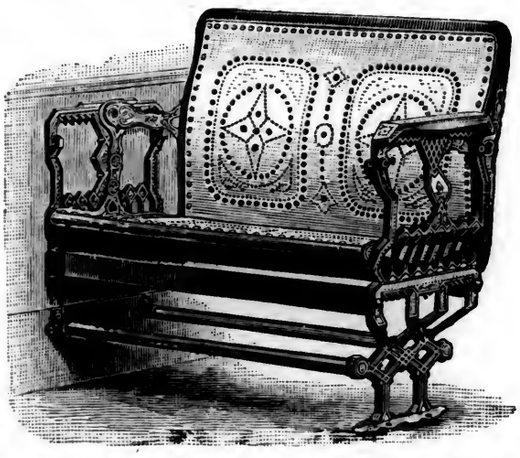
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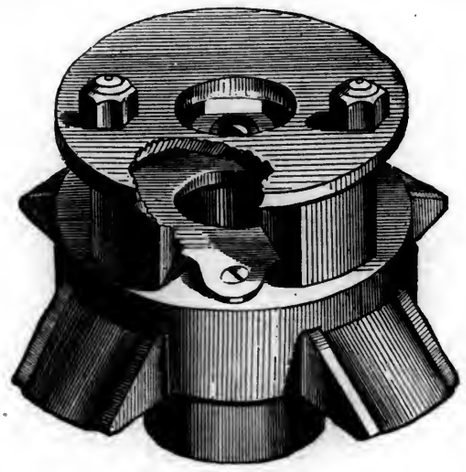


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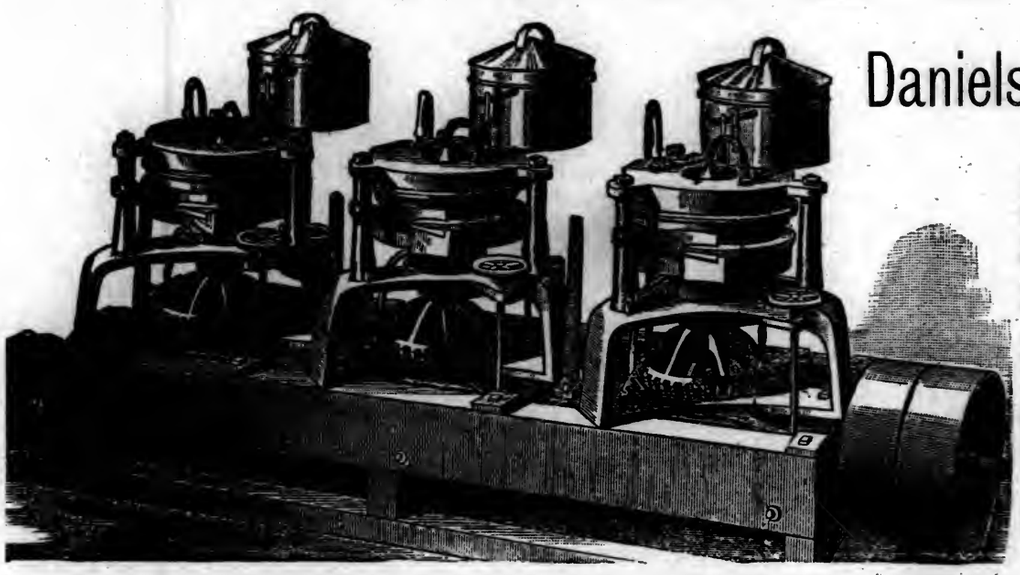


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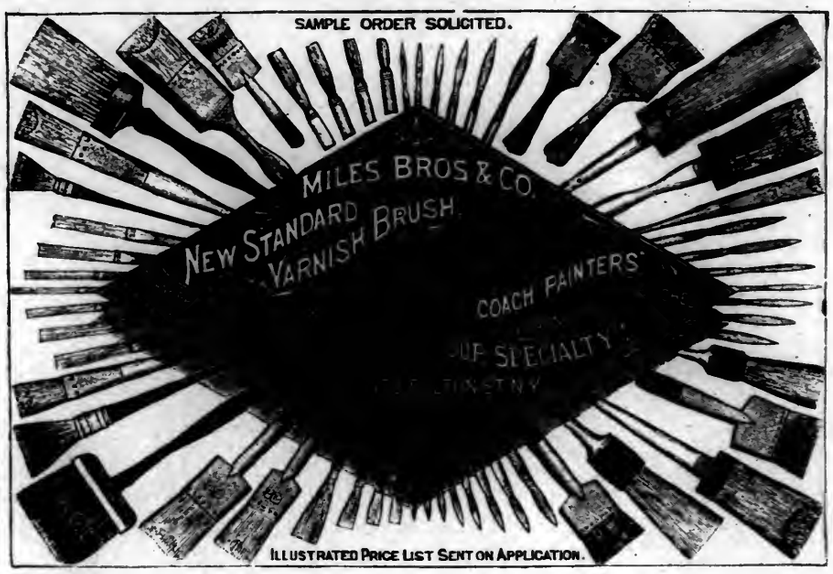
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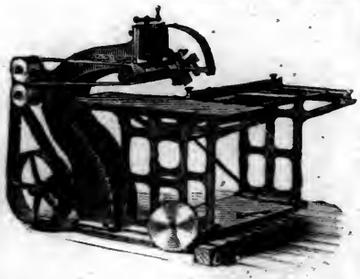
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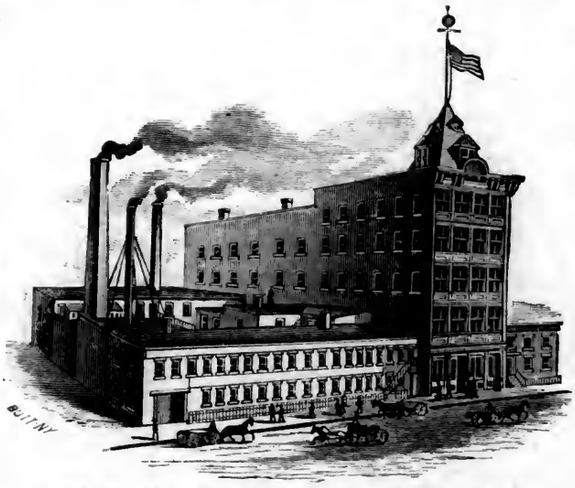
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AMERICAN
Railroad Journal
·ESTABLISHED·1831·

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Railroad Notes.

FINANCIAL.

THE annual meeting of the Ontario and Western shareholders, was held in New York on the sixteenth of January. President Winslow's report stated that the unfunded debt of the company had been reduced from $2,311,898.85 to $1,221,106.48; also that one-half (23,000 shares) of the capital stock of the West Shore and Ontario and Terminal Company was owned by the Ontario and Western Company, which was, jointly with the West Shore, lessee of all the terminal property at Weehawken and in New York. The regular ticket was elected after a stormy time. Treasurer Jordan made application for a receiver for the company, in the United States Circuit Court, on the same day of the meeting. His complaint recites that the defendant possesses a capital stock of sixty million dollars, of which two million is preferred stock and fifty-eight million is common stock. Included in its indebtedness were unpaid vouchers in the hands of the treasurer amounting to $171,703.95; unpaid vouchers in the hands of the auditor, $102,885.58, making a total of $274,589.53; December pay rolls in the hands of the auditor, $101,766.76, less $10,200 advanced by the treasurer, making a total of $91,566.76; notes outstanding as per schedule, $516,371.63; loans outstanding as per schedule, $412,749.38, making the entire amount of recorded indebtedness $1,295,277.30. To this sum must be added debts incurred for indorsements, the amount of which is unknown. Beyond the current receipts derived from operating its road, it is alleged the defendant corporation has no money in its treasury, and "no resources whatever to meet its obligations and pay its present or maturing debts; that its credit is entirely gone, and that said defendant has become, and now is wholly insolvent."

THE Brooklyn Elevated Railway Committee held a meeting in New York, January 24, to receive subscriptions to the fund of $400,000 necessary to be raised to put the enterprise on its feet. Mr. Frederick Uhlman presided, and reported that no subscription would be binding unless the $400,000 was subscribed before February 20, and that no money would be expended unless, before April 1, 1884, a contract shall be signed insuring the construction and equipment of the railway from Fulton ferry or the bridge to East New York. The committee reported that on the receipt of the $400,000 such a contract could be had, the iron firm taking it agreeing to construct and equip the road at a cost of not over $1,500,000, and to take its pay in the securities of the road at a price which has not yet been determined upon. At the opening of the meeting subscriptions amounted to $134,500, and at the close to $170,000, with an additional one promised of $25,000.

THE Missouri Pacific, Jay Gould, president, has issued the following statement of its business for 1883 to its stockholders in advance of the regular annual report, which will not be due for some time. The December business is partly estimated, but the actual results will vary but slightly from the following: Gross earnings of the Missouri Pacific and Iron Mountain railways for the year, $17,107,441; operating expenses, 53.8 per cent. Gross earnings, including $607,648 for betterments and for construction, $9,205,100. Net earnings, $7,902,341. Dividends received during the year on investments, etc., $449,282. Total estimated receipts, $8,351,624. Deduct interest, rentals and other charges, including taxes, $4,137,861. Total net profits after payment of all fixed charges, $4,213,763. Or more than 14 per cent. on $30,000,000 capital stock, representing 1,895 miles of railroad, or about $16,000 per mile.

THE annual meeting of the stockholders of the Philadelphia and Reading Railroad Company was held January 14. The report which was adopted showed a surplus of $2,137,232, thus allowing seven per cent. on the preferred and six per cent. on the common stock, with a balance of $57,634 applicable to the payment of interest on the deferred bonds. The net profits for both the railroad and coal companies amount to $15,385,842, out of which all rentals and interest accounts have been met, leaving the surplus as stated above. The report closes with the recommendation of the board of managers for the creation of a collateral trust loan of $12,000,000, at five per cent., to pay off the floating debt, the income mortgage bonds, and to purchase outright the 50,000 shares of Jersey Central stock. The following gentlemen were elected officers: President, George de B. Keim; treasurer, William A. Church; secretary, Albert Foster.

THE gross earnings of the Norfolk and Western Railroad Company for December were $232,752; expenses, $146,764; net earnings, $85,988; decrease of $15,195 as

compared with corresponding month last year. The gross earnings for 1883 were $2,812,776, and the expenses $1,509,573, leaving the net earnings $1,303,203, or $196,039 in excess of the previous year. The gross earnings of the Shenandoah Valley Railroad Company for December were $63,358, the operating expenses $54,248, and the net earnings $9,110, an increase of $20,315 as compared with December, 1882, there having been a loss in the latter month. The gross earnings for the year 1883 were $854,415, the operating expenses $662,157, and the net earnings $192,257, as compared with a loss of $8,212 for the year 1882.

THE gross earnings of the Philadelphia and Reading Railroad Company for December were $2,297,642 and the expenses $1,412,086, leaving the profit for the month $885,556, an increase of $46,947 as compared with the corresponding month of last year. The gross receipts of the coal and iron company for the month were $1,110,456, and the expenses excluding interest, $1,216,566, a loss of $106,110, against a profit of $5,174 for the corresponding month of last year. This statement includes the following from the operations of the Central Railroad of New Jersey: Gross receipts, $735,841; working expenses, $465,546; earnings, $270,295; rental for December, 1883, $484,090; loss for the month, $213,795.

THE official statement of the business of all lines of the Pennsylvania Railroad Company east of Pittsburgh and Erie for December, 1883, as compared with the same month in 1882, shows a decrease in gross earnings of $316,659, a decrease in expenses of $315,034, and a decrease in net earnings of $1,625. The twelve months of 1883, as compared with the same period of 1882, show an increase in gross earnings of $2,003,418, an increase in expenses of $1,099,745, and an increase in net earnings of $903,673. All lines west of Pittsburgh and Erie for the twelve months of 1883 show a surplus over all liabilities of $803,848, being a decrease as compared with the same period of 1882 of $1,090,452.

THE stockholders of the Buffalo, New York, and Philadelphia Railroad Company held their annual meeting in Philadelphia, January 14, and elected the following officers: President, G. Clinton Gardner; Directors, G. Clinton Gardner, C. H. Clark, E. A. Rollins, B. K. Jamison, J. W. Jones, Isaac N. Seligman, E. F. Winslow, A. N. Martin, C. H. Alden, Bryce Gray, E. L. Owen, B. C. Rumsey, and P. P. Pratt. The annual report showed that the total earnings for the year ending Sept. 30, had been $2,703,128, and the expenses $1,387,189, leaving net earnings of $1,315,939, being an increase as compared with the previous year of $11,730.

THE official annual statement of the Chicago, Milwaukee and St. Paul Railway Company for 1883 shows that the gross earnings for that period were $23,659,823.48. The operating expenses, including taxes and insurance, were $13,778,037.95, being 58 23-100 per cent. of the gross earnings. The net earnings were $9,881,785.53, out of which $5,373,925.50 was paid in interest on bonds, leaving a balance of $4,507,860.03 applicable to dividends as follows: $1,157,868.81, seven per cent. on $16,540,983 of preferred stock, and $2,163,298.27, seven cent. on $30,904,261 of common stock. After all payments a balance is reported of $1,186,692.95.

THE United States Circuit Court, Chicago, has authorized the receiver of the Toledo, Cincinnati and St. Louis Railroad Company to issue receiver's certificates, bearing six per cent. interest, to the amount of $110,000, to pay the amount due for the construction of that portion of the road between Kokomo and East St. Louis. This perfects the title in the mortgage, the bondholders' certificates remaining, however, the first lien on that portion of the road lying between the two cities named.

THE Chicago, Milwaukee and St. Paul Railroad has applied to have 120 additional of its Wisconsin and Minnesota five per cent. 40-year gold bonds listed at the Stock Exchange. The same company also asks to have listed 860 of its one-thousand-dollar bonds, dated January 1, 1881, and payable January 1, 1921, issued to cover forty-three miles of new road completed since November 15, 1883, at a cost of $20,000 a mile.

SHOULD all the bills at this writing before Congress, which have for their object the forfeiture of unearned lands by railroad companies, become law, the companies would lose about one hundred million dollars' worth of fertile soil. The chances seem to be against the companies, who will probably dispute the constitutionality of acts declaring their lands forfeited.

THE annual meeting of the stockholders of the Pennsylvania and New York Canal and Railroad Company, which is being controlled by the Lehigh Valley Railroad Company, was held at Philadelphia, January 14. The annual report showed that the total earnings for the year were $2,316,847, the operating expenses $1,355,026, and the net receipts $961,821.

THE Northern Railway Company (California) has applied to the New York Stock Exchange to have outstanding bonds, amounting to $3,964,000, listed. These bonds represent the road completed from West Oakland to Martinez, Benecia to Suisun, and from Woodland to Tehama, aggregating about 150 miles. The bonds are dated January 1, 1877, and are due January 1, 1907, with interest at six per cent.

ARTICLES of association for the Little Rock and Choctaw Railroad have been filed with the secretary of state of Arkansas. All the capital stock, $1,000,000, has been subscribed. The stockholders will elect officers and directors, March 1. Commencing at Little Rock, the road will run through Pulaski, Perry, Yell and Scott counties to a point on the Choctaw line in the Indian Nation.

A FINANCIAL statement of the Keokuk and Des Moines Railroad, which is a leased line of the Rock Island Company, for the year ending September 30, 1883, shows as follows: Gross earnings, $534,466.99; rental, 25 per cent. guaranteed by the Rock Island, $133,616; interest, $137,500; deficit paid by the Rock Island Road, $3,833.25. On September 30, there was a cash balance in the Keokuk and Des Moines treasury of $4,137.41.

THE gross earnings of the Northern Central Railway Company for December were $409,151, and the expenses $389,771, leaving the net earnings $19,380, being a decrease of $9,307 as compared with the corresponding month in 1882. The gross earnings for the year were $6,088,130, and the expenses $3,831,604, making the net earnings $2,256,526, being a gain of $298,672 as compared with the previous year.

AT Trenton on the tenth ult., in the Dinsmore case under trial in the United States Circuit Court, W. A. Church, treasurer of the Reading Railroad, produced a statement of the indebtedness on that date. He said the road proper was ninety-three miles in length, and that its capital was about $35,000,000, including preferred stock.

THE estimated earnings on the Chesapeake and Ohio Railway, January 1 to 14, were $113,179.48, an increase of $7,254.00 over those in the same period last year; no additional mileage. During the same period, the estimated earnings on the Elizabethtown, Lexington and Big Sandy Railroad, were $20,650.00, a decrease of $1,471.24 from the earnings the same period in 1883.

THE total earnings of the Denver and Rio Grande Railway for January, to the end of the fourth week, and year to date, were $474,900, an increase of $26,400 above corresponding period as reported a year ago. Miles in operation by the company including leased lines, are 1,679; being an increase of 364 miles from this time last year.

JUDGMENTS have been entered in the United States Circuit Court, Oxford, Mississippi, of $191,000 for Green, Hamilton & Co., of Jackson; one of $69,000 for the Indianapolis Rolling Mill Company, and one of $51,000 for Fred Wolff, of New York, co-plaintiffs, against the Memphis, Selma and Brunswick Railroad Company.

THE Philadelphia and Erie Railroad Company reports its earnings, for December, 1883, as follows: Gross earnings, $257,306; expenses, $219,402; net earnings, $37,904; net earnings in December, 1882, $85,686; decrease, $47,782; net earnings for the year 1883, $1,488,019; net earnings for the year 1882, $1,411,878; increase, $76,141.

THE Secretary of the Treasury has accepted the offer of the New York Central Railroad Company to pay $65,000, in compromise of the liabilities incurred by the Hudson River Railroad Company, amounting to about $80,000, prior to the consolidation of the two companies.

THE New York Stock Exchange Committee on stock lists has reported in favor of the application of the Missouri, Kansas and Texas Railroad to list $10,000,000 of five per cent. consolidated mortgage bonds, which will retire the $10,000,000 six per cent. second mortgage bonds.

THE governing committee of the New York Stock Exchange has refused to list $180,000 of the new issue of the first mortgage sinking fund bonds of the Indianapolis, Decatur and Springfield Railroad. The holders of the said bonds, it is stated, are about to apply to have their old bonds returned.

IT is officially stated that the general manager of the Lake Erie and Western Railroad reports that the net earnings of that road for the first five months of the present fiscal year will show a surplus of $102,487.36 over all operating expenses and fixed charges.

ENGLISH lines cost, on an average, about four times as much as American; French about three times as much, and German about twice as much. Austrian lines are more expensively built than those of North Germany, and cost nearly as much as French.

A PROPOSITION is under consideration by which the Richmond and Danville Railroad Company will be able to borrow $2,000,000 from the city of Baltimore, on fifty years' time, but payable at the option of the company.

THE net earnings of the Pittsburgh and Lake Erie road in 1883 were four hundred thousand dollars.

THE Brownell & Wight Car Company, St. Louis, are full of work and report a good outlook.

CONSTRUCTION.

THE New York, Danbury and Boston Railway will be commenced this winter. Its route as now projected will connect at Bronxville with the Second Avenue Railway, New York, pass under the arched bridge of the New York, New Haven and Hartford Railroad at Port Chester, strike the old grade of the Port Chester and Ridgeton Road, a mile northeast of Port Chester station, follow this with very slight changes to Ridgefield, and thence, by a new survey, to Danbury, where it is proposed to connect with the New England Road to Boston. The total distance as surveyed is a fraction less than sixty-five miles.

THE projectors of the New York and Connecticut Air Line, one of the parallel railroads, have given out the contracts for the building of their road from the New York State line at Greenwich to New Haven. The company, under the general railroad law, has until March 24 to begin construction, by which time it must pay in $23,970 or forfeit its corporate existence. Railroad men in Connecticut admit that it looks as if a road parallel to the New York, New Haven and Hartford, and running between New York and Boston, was at last to be built. The layout of the road is from Greenwich to New Haven.

THE Macon and Florida Air Line Railroad, will run from Macon, Georgia, due south 200 miles through the finest untouched body of timber in the South and a rich undeveloped agricultural land, to Lake City, Florida, connecting with the extensive narrow gauge system of that State. It will furnish a direct outlet and the shortest route for Northern and Western freight. Macon will thus be made a great fruit center and distributing point for Florida business. The estimated cost of the road is $8,000 a mile. It will be rapidly pushed forward to completion.

THE directors of the Lake Erie and Western Railroad, are reported to have resolved to build forty-three miles of additional road between Bloomington and Peoria, which will be known as the Lake Erie and Mississippi Railroad. This new road will be built by issuing bonds for the exact cost of the road. This extension, it is said, will make the Iowa Central and the Peoria, Decatur and Evansville Roads feeders of the Lake Erie and Western, and will entitle the last named road to a share in the pooled business at Peoria.

THE Senate of Virginia has lately passed a bill extending the time for the completion of the New York, Philadelphia and Norfolk Railroad. This company, under the bill, is allowed two years longer in which to complete its line of railroad from a point on the Maryland State line to a point near Cherrystone, in Northampton County, Virginia. A condition of this extension is that the company shall complete one-half of said railroad by the expiration of one year from the passage of the act.

SURVEYS have been begun for a new railroad between Schleisingerville, Wisconsin, and Chicago. It is surmised that the branch is intended to give the Wisconsin Central

Road a direct line to Chicago, and railway men say the Northern Pacific will then buy the Wisconsin Central and this branch, thus having direct connection with Chicago.

THE Columbus and Eastern Railroad, extending from Columbus to the coal fields of Muskingum and Perry Counties, was opened for traffic January 21. J. E. Redfield, of Essex, Connecticut, is president of the enterprise, which promises to take a high rank among the Ohio system of coal roads.

THE greatest elevation which will be reached by the Pike's Peak Railway will be 14,146 feet, higher by two thousand feet than any railway in the world. It is to be twenty-seven miles long, narrow-gauge, and the trains will be composed of three carriages, each carrying forty passengers.

SEVEN tunnels, of a total length of seven miles, will be built on the line of the Harrisburg and Western Railway, between Harrisburg and the Youghiogony River. This portion of line will cost about two hundred thousand dollars per mile. It is to be completed in two years.

THE Carolina, Cumberland Gap and Chicago Railroad has been surveyed along its entire proposed route, which extends from Aiken, South Carolina, to London, Kentucky, a distance of more than 400 miles in almost an air line. It is probable that the road will be constructed.

RECEIVER ASHBEL GREEN has full control of the property of the North River Construction Company, including that in both New York and New Jersey. The company owns 200,333 shares of New York, West Shore, and Buffalo Railway stock.

THE number of miles of railway in operation in New Zealand at the end of March, 1883, was 1,370 miles. The revenue derived from the railways during the same period was £953,347, and the expenditures were £522,822.

THE railroad commissioners of Connecticut have approved the layout of the line from New Britain, on the New England road, to New York city, and thence to the New York State line, at Greenwich.

THERE are now ten new lines of railway—national, provincial and private—in course of construction in the Argentine Republic, and there are about 14,500 men engaged on these works.

A SURVEY is in progress of a branch from the Shenandoah Valley Railroad to the West Virginia line. The work will be commenced at Harrisonburg and will be rapidly prosecuted.

THE Elevated Railroad bill, Boston, was passed to a third reading in the House by an overwhelming majority, January 31.

IT is expected that trains will be running into Reading over the Schuylkill Valley Railroad by the middle of August.

THE Northwestern Railway Company (English) are building freight cars, the frames of which are of mild steel.

THE Toledo, Cincinnati and St. Louis Railroad is to be converted from a narrow to a standard gauge railway.

THE railway from Sanford to Tampa, Florida, is practically completed, and trains are running over it.

PERSONAL.

JAMES FREEMAN CLARKE, one of Cleveland's most prominent business men, is dead after a brief illness. Mr. Clarke was seventy-eight years of age. He went to Cleveland from Cooperstown, New York, in 1837. For many years he was engaged in mercantile business, and finally retired from it to give a closer attention to railroad and mining interests, in which he became largely interested. He was elected a director of the Cleveland and Pittsburgh Railroad Company in 1856, and has continued a director of the company from that time until his death. He was formerly president of the Atlantic and Great Western Railway Company, and was vice-president of it at the time of his death. He was also president of the Ohio and Pennsylvania Coal Company, and a director of several bank corporations. Mr. Clarke was one of the wealthiest men in Cleveland, and is said to have been the largest owner of Government bonds in that city.

THE stockholders of the New Orleans and Northeastern Railroad have elected the following board of directors: O. Plock, W. A. Goodman, Alexander McDonald, A. Wessel, John Scott, H. Abraham, E. L. Carriere, Robert Mott, and J. H. Oglesby; and the following officers: John Scott, president and general manager; Alexander McDonald, vice-president; O. T. Ambrose, secretary; F. Hahn, treasurer.

THE following gentlemen constitute the newly-elected board of directors of the Maryland Central Railroad Company: William H. Waters, William Gilmor, John M. Denison, Joseph M. Streett, Foulk Jones, James P. Streett, Thomas Armstrong, Eli Tucker, Caleb J. Moore, Charles W. Hatter, Granville O. Wilson, Caleb S. Taylor, and Henry R. McNally.

ON January 17, the directors of the Northern Pacific Railroad Company elected Robert Harris, one of their own number, and a vice-president of the New York, Lake Erie and Western Railroad, president in place of Henry Villard, whose resignation was accepted at the last meeting. Mr. Harris is a thorough railroad man. His age is about sixty.

S. M. FELTON, JR., lately the general manager of the New York and New England Railroad, has retired from that position, in order to accept an appointment as assistant to President Jewett, of the New York, Lake Erie and Western. Mr. Felton will have his headquarters at Cleveland, and will perform the duties of a vice-president.

MR. J. E. CHILDS has been, at his own request, relieved from his duties as assistant general superintendent of the New York, West Shore and Buffalo Railway, in order that he may give his entire time to his duties as general superintendent of the New York, Ontario and Western Railway.

JAMES MCCLINTOCK CREIGHTON has been appointed general manager of the New York, Lackawanna and Pittsburgh Fast Freight line. He resigned as general freight agent of the Pennsylvania Railroad Company to accept this new position.

MR. CHARLES D. GORHAM has been appointed assistant general superintendent of the New York, West Shore and Buffalo Railway. His office will be at the Weehawken passenger station. The appointment took effect February 1, 1884.

STRICKLAND KNEASS, formerly chief engineer and surveyor of Philadelphia, and for many years assistant to the president of the Pennsylvania Railroad Company, died in Philadelphia on the fourteenth ult.

JUDGE PRATT, Brooklyn, has appointed General Jourdan, acting president of the road; also receiver of the Brooklyn, Flatbush, and Coney Island Railroad, better kown as the Brighton Beach line.

SAMUEL BRIGGS, general manager of the Connotton Valley Railroad, has been appointed receiver of the same.

MISCELLANEOUS.

W. ENDICOTT, president of the Oregon and Transcontinental Company, has written to President Hatch, of the New York Stock Exchange, as follows: "In view of the numerous invented rumors put into circulation to depress the stocks in which the Oregon and Transcontinental are interested, I deem it my duty to state that the company has not diminished its holdings of the various stocks enumerated in the reports of the investigating committee." Treasurer White says that he knows nothing about the reports, wired from Boston, that an application is to be made to put the company into the hands of a receiver and that the company is about to go into voluntary liquidation. Mr. White also says that negotiations are pending for the leasing by the Northern Pacific Railroad Company of the railroad and steamship lines of the Oregon Railway and Navigation Company. President Endicott states that the Northern Pacific people have no intention of leasing the lines of the Railway and Navigation Company.

THE station indicator invented by Henri E. Bissell, of Hartford, Connecticut, is being tried on the aerial railway of this city. At either end of the car, just above the door, is a neat box, on which is painted the words "Next station." Below this appears the name of the station at which the next stop is to be made by the train. As soon as the train leaves the previous station, the passenger hears a bell ring at either end of the car and sees the annunciator change to read the name of the next. The changes are made simultaneously, and the ringing of the bells and changing of the indicator is accomplished simply by the moving of a lever in the locomotive cab, connected with the air-brake valves. The connections between the cars and the locomotive are rubber tubes of the air-brake.

AT the annual meeting of the stockholders of the Fitchburg Railroad, in Boston, January 29, the old board of directors and the president. E. B. Phillips, were re-elected. It was voted to issue coupon or registered bonds of scaled notes from time to time in addition to the bonds already issued to an amount not exceeding half a million of dollars for the purpose of funding the floating debt and for the payment of money borrowed for any lawful purpose; also that the issue of $1,000,000 Vermont and Massachusetts railroad bonds, dated May 1, 1883, at five per cent. per annum, instead of six per cent., is approved by the corporation.

ARNOLD LEO, a shareholder in the Union Pacific Railway Company, brought a suit in the United States Circuit Court, New York, against the company and Sidney Dillon, its president, to restrain the company from employing its assets in excess of its corporate powers by issuing bonds for the purpose of obtaining money with which to extend its lines. The company demurred to the bill of complaint, and the case was argued before Judge Wheeler last October. Judge Wheeler has rendered a decision sustaining the demurrer.

FOLLOWING the retirement of the Vanderbilt railroads from the Hoosac Tunnel line comes the formation of the Hoosac Tunnel Dispatch Fast Freight line, which has been organized to run over the Fitchburg, Troy and Boston, the Delaware and Hudson Canal Road, the New York, Lake Erie and Western, and the Grand Trunk west of Buffalo and all its western connections. W. E. Everest, late assistant manager of the Great Eastern line, has been appointed general manager of the new organization, and he will open its chief office in Buffalo, New York.

IT is reported that, a few days ago, William H. Vanderbilt, being asked whether he had gone to the rescue of the West Shore and Buffalo Railroad Company, replied that he had not and that he did not want the property: "I repeat what I said the other day, that the building of that road was merely a blackmailing scheme. If the men who have built it went into it actually believing that there was a necessity for it, and that it would prove a paying investment, then they are bigger fools than I supposed."

THE directors of the Kentucky Central Railroad Company have elected C. P. Huntington, president and Isaac E. Gates treasurer. It is stated that the road will be made a part of the Chesapeake and Ohio system. The main line of the Kentucky Central runs from Covington to Lexington, a distance of 100 miles. Its Richmond branch and Maysville and Lexington division increase the number of miles operated to 184.

THE Joint Executive Committee (passenger department) of the Eastern and Western railroads has extended the present pooling contract from March 1 to May 1, and appointed a meeting to take place in April for the renewal of the contract and the readjustment of percentages in the differential fare pools. In the meantime necessary changes in rates will be by arbitrary arrangement.

SENATOR EDMUNDS has introduced a bill to amend the Pacific Railroad act of July 1, 1862, and the acts of July 2, 1864, and May 7, 1878. It provides for the settlement of the claims growing out of the issue of bonds to aid in the construction of the railroads mentioned in the act, and for the securing to the United States the indebtedness of said company.

THE Baltimore and Ohio Railroad Company has purchased the Buckeye Car Works, situated in the eastern part of Columbus, Ohio, and will take possession about the first of March. The railroad company has long needed works of this kind, having none west of the Ohio River. As soon as it takes possession about 300 men will be employed in the building of cars.

MR. ALBERT FINK has come to the conclusion that it might be well for the National Government to have a permanent railroad commission to study the problems of inter-State commerce and supervise the action of railroads engaged in it.

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NEW YORK, FEBRUARY, 1884.

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THE BUSINESS SITUATION AND OUTLOOK.

THE year opened with a general depression in business, now somewhat relieved by an improved tone; but the feeling in the air is that legislative changes are called for by changed conditions resulting from a variety of causes. Better crops abroad have weakened foreign demand for American grain, which, by the way, is not so plenty as usual in recent years. Moreover, the cheaper culture of wheat in India, Russia, and other countries, farther depresses the export trade of that staple, a fact the consequences of which will prove more adverse to our commercial interests in the future. According to its due proportion, internal trade suffers from the causes mentioned, and while it is true that the total returns from railroad traffic were larger in 1883 than in 1882, the most sanguine can hardly expect that the earnings for this year will be as satisfactory. The reduction in mileage last year was significant of the impression, more or less defined and positive, that railroading has been overdone in this country; and, for our own part, we are prepared to think that a reduction of new mileage during this year, especially in parallel roads, would be to the nation's advantage. What the effect of the almost certain early completion of the Canadian Pacific Railway may be upon our trade, cannot, perhaps, be certainly foretold; but it can hardly be doubted that it will divert immigration from the United States to an appreciable extent, and afford the Dominion agriculturist of the Northwest a cheaper means of communication with the east than by means of our railroads.

Turning to the department of manufactures, the most striking feature of its present condition is overproduction, the result, on the one hand, of the artificial stimulus wrought by protection, and, on the other hand, of a foreign trade exceedingly limited in its dimensions.

The conditions thus briefly outlined are sufficient to account for the general disposition to look to Congress for measures of relief, and for the war of words between newspapers representing, on the one side, the interests of those who imagine that they would suffer by considerable changes in the tariff, and on the other, the nation at large. Not for many years has the strife been keener between these two parties, significant, dislike it whether we will or not, of an uneasy hankering after legislative changes of some kind. Meanwhile statesmen appear to linger shivering on the brink. While seemingly they read correctly the signs of the times, they dare not lead, apprehensive of prejudice to their party interests. Delay in acting, however, the present and prospective condition of internal and foreign trade being regarded, must of necessity be short-lived. Action must be taken, and that before long, and the opportunity now presenting itself to courageous statesmanship will be given to new men unless promptly taken advantage of by present leaders.

Report of the Connecticut Railroad Commissioners.

IT appears from the Thirty-first Annual Report made by the railroad commissioners of Connecticut that there are twenty-three railroads in that State, not including branches. The total length of these roads, single track, is, approximately, 1,970 miles, of which, approximately, 1,360 miles are in Connecticut. The total amount of stock issued is $56,953,678.25, being an average of $41,024.34 per mile; of which $17,635,430 is the amount of stock held in the State, by 5,601 persons. The total amount of debt on the twenty-three roads is $31,118,353.19, an average of $22,414.88 per mile. Total stock and debt, $88,072,031.44; total permanent investments, $87,303,858.11, and total assets, $96,631,733.99. The gross earnings for the year were $16,234,942.44, an increase of $881,286.40; operating expenses, $11,890,389.57, an increase of $1,551,587.36; net earnings after deducting $10,552.15, deficit reported by the Shepaug Railroad Company, $4,344,552.87, or $670,300.96 less than the preceding year. The total number of passengers carried during the year amounted to 16,352,617, an increase of 945,831, or six per cent. The receipts averaging forty-three cents a passenger. The mileage was 336,254,721, an increase of 13,727,801 miles. The freight carried amounted to 7,219,469 tons, an increase of 572,631 tons, or nearly nine per cent. The receipts averaged 1.95 cents per ton per mile.

The commissioners devote a good deal of space to the New York and New England Railroad, of which the gross receipts for the year are $3,568,653.47, an increase of eight per cent. over those of the preceding year. "The operating expenses are $3,111,312.62, thirteen per cent. more than last year, and nearly seven-eighths of the entire gross earnings. The net earnings, $457,340.85, are $400,000 below those of the preceding year. The board of directors chosen December 11, 1883, caused a thorough investigation to be made into the affairs of this company, which resulted in finding such an unsatisfactory financial condition that on the first of January, instant, the president of the company, Charles P. Clark, was, on motion of second mortgage bondholders, appointed receiver of the company by the United States Circuit Court for the Second Judicial District, and the road is now being run by him in that capacity."

As regards the condition of the railroads, the commissioners say: "We are glad to be able to report in general terms an improvement of the condition of nearly every road in the State, as evidenced by the continued substitution of steel for iron rails, the filling up of pilings and trestle-work, the replacing of wooden structures by stone or iron, the increased attention paid to the surface and alignment of the track, and the establishment of approved electric signals at various points of danger."

The authors of the report are not satisfied with railroad legislation as it now is. "The theory of our general railroad law is that whenever a considerable number of persons (twenty-five) can be found who are willing to subscribe from ten to twenty per cent. of what it would cost to build a railroad, and pay in ten per cent. of the amount subscribed, that under those circumstances there exists a public convenience and necessity which demands the construction of the road and permits the exercise of the right of eminent domain by the corporators. The interpretation of the law however is such, that if one person can find twenty-four others who are willing to associate with him, he may himself furnish all the capital, and, subject to the assent of a board of directors chosen by him, exercise the right of eminent domain with only the very limited restriction which the railroad commissioners have authority to impose." Regarding this state of the law, the commissioners say: "It is not too late to question, and we think it would be wise to consider, whether some restriction should not be placed upon the exercise of that right (of eminent domain)."

Vanderbilt vs. Winslow.

WILLIAM H. VANDERBILT, in an interview with a New York *Times* reporter, said: "The New York Central has one bond of $40,000,000 and another extension of an old issue of $12,000,000. The two make $52,000,000, and that is all. The West Shore's first mortgage is $50,000,000; it put up $10,000,000 of its income bonds with the North River Construction Company, and then there is the $12,000,000 terminal mortgage, which is spouted with the Equitable Life Assurance Society for $6,000,000, which I guess the insurance company wishes it had back. That makes $72,000,000 out now, doesn't it, to say nothing of anything else." He said further that the object of the building of the West Shore was "to blackmail the New York Central," and that "the West Shore will have to take all the New York Central's business in this State to earn the $11,000,000 necessary to pay the operating expenses and interest on the bonds."

General Edward F. Winslow, president of the Construction Company, which built and owns the controlling interest in the West Shore, replied to these statements on the following day, in an interview with a representative of the same journal. He is reported to have said: "Mr. Vanderbilt states that the New York Central has one bond of $40,000,000, and an extension of an old issue of $12,000,000. In instituting a comparison, he neglects to state that the interest upon more than half of the New York Central's bonds is seven per cent., while on the West Shore securities the interest is but five per cent. He also omits the fact that the New York Central pays nearly $2,000,000 annual rentals, which is a fixed charge, and which, if capitalized at five per cent. would represent an additional indebtedness of $40,000,000. He makes no mention of the floating debt of the New York Central Company. Another reckless statement is the one that the Equitable Life Assurance Society has loaned $6,000,000 upon first mortgage bonds of the Terminal Company. This demands the most emphatic denial. The West Shore and Ontario Terminal Company is a corporation entirely distinct from the two railway companies, but its capital stock is owned by the West Shore and the New York, Ontario and Western separately, but equally. I see Mr. Vanderbilt utters a pretended belief that the West Shore Road was built for the purpose of forcing the New York Central Company to buy it. The complete answer to this is the fact that it has never been offered for sale to him or to any company with which he is connected, or to any other parties, and I hope, for the interests of the mercantile community of New York State, that it never will be." In answer to the last quoted statement made by Mr. Vanderbilt, General Winslow said: "As the fixed charges of the West Shore, with its leases and terminals, will not ex-

ceed $3,000,000, any one familiar with railways can see the recklessness of such a statement."

South Carolina Commissioners' Report.

FROM the Fifth Annual Report of the South Carolina Railroad Commissioners, politely sent us by those gentlemen, we clip the following information:

NEW AND PROJECTED RAILROADS.

The Georgetown and Lane's Road, running from Georgetown to Lane's, a station on the Northeastern Railroad, thirty-six miles from Georgetown and fifty-five miles from Charlestown, has just been completed and not yet put into operation. It is a valuable addition to the railroad system of the State, bringing into intimate communication with the other portions of the State a section hitherto somewhat inaccessible, and opening another shipping port in the State. Its officers report that "the road is laid with the best steel rails and is first-class in all of its appointments, including cars of 40,000 pounds' capacity."

The Carolina, Cumberland Gap and Chicago Railroad Company encourage the hope that this railroad, so important to the State, will ere long receive the financial support requisite to carry it forward.

The grading of the Spartanburg, Laurens and Greenwood Road is progressing rapidly to completion, and the road will probably be in operation before the next session of the Legislature.

Work on the Greenville and Laurens Road, the commission is informed, will be soon begun and the work pushed rapidly forward.

CAPITAL STOCK.

The capital stock of the railroads as far as reported is $15,646,160.

DEBT.

The total debt of the roads which have given this item in their annual reports is: Funded, $26,583,770.11; unfunded, $1,053,659.87, making a total of $27,637,429.98. Average debt per mile, $13,521.41. The Asheville and Spartanburg, Charleston and Savannah, Cheraw and Chester, Chester and Lenoir, Laurens Railway, and Spartanburg, Union and Columbia Railroads, make no report.

INCOME.

The income of the roads for the year ended June 30, 1883, is $5,832,281.19, as follows:

Earnings passenger department	$1,773,192 97
Earnings freight department	3,938,616 89
Income from other sources	120,471 33
	$5,832,281 19

EXPENSES.

The total expenses of the roads for the year ended June 30, 1883, is	$4,191,367 16
Showing a net income	$1,640,914 03
An increase over last year of	445,261 82

AMOUNT OF BUSINESS.

The following statement shows the number of passengers and tons of freight transported during the years ending June 30, 1882, and June 30, 1883:

Passengers Carried.

	1882.	1883.
Number	961,313	1,135,697
		961,313
Increase		174,384

Tons of Freight Carried.

	1882.	1883.
Number	1,323,361	1,501,150
		1,323,361
Increase		177,789

MILEAGE.

The following statement shows the train, passenger and freight milcage:

Mileage of passenger trains	4,381,120
Mileage of freight trains	7,554,725
Mileage of other trains earning revenue	6,623,143
Asheville and Spartanburg, not given in detail	129,396
Total	18,688,384

TAXES.

The taxes paid by the various roads amount to $202,226.19, as follows:

In South Carolina	$166,650 55
In North Carolina	5,726 70
In Georgia	852 49
C., C. & A. R. R., not given in detail	28,996 36
Total	$202,226 19

ROLLING STOCK.

The combined rolling stock of all the roads is as follows:

Locomotives	198
Passenger cars	126
Freight cars	2,949
Express and baggage cars	58
Other cars	120

Of the locomotives 85 are equipped with air brakes, and of the cars 190 are equipped in like manner. This statement shows an increase over last year of 6 locomotives, 473 freight cars and 20 express and baggage cars.

STATIONS AND EMPLOYÉS.

There are 380 stations, of which 313 are in this State, and 6,126 employés, including officials.

HIGHWAY AND RAILROAD CROSSINGS.

Of 866 highway crossings, 815 are at grade, 20 under and 31 over. Of railroad crossings there are 12 in this State.

BRIDGES AND TRESTLES.

There are 59 bridges on the different railroads, of which 4 are iron, 39 wooden and 12 combination. Of these, 4 have been built during the year: 1 iron, 1 wooden and 2 combination.

There are 788 trestles, with a total length of 187,803.2 feet, and replaced by earth during the year 9,076 feet.

COMPARATIVE STATEMENT OF TOTAL INCOME.

Expenses and Net Earnings.

Total income of all the roads for 1883	$5,832,281 19
Total expenses of all the roads for 1883	4,191,367 16
Net earnings	$1,640,914 03
Total income in 1882	$5,885,738 31
Total expenses in 1882	4,690,086 10
Net earnings	$1,195,652 21
Net earnings for 1883	$1,640,914 03
Net earnings for 1882	1,195,652 21
Excess of net earnings for 1883	$445,261 82
Total income for 1883	$5,832,281 19
Total income for 1882	5,885,738 31
Excess of total income for 1882	$53,457 12
Total expenses for 1883	$4,191,367 16
Total expenses for 1882	4,690,086 10
Excess of expenses in 1882 over 1883	$498,718 94

IRON IN NEW SOUTH WALES.—In our advertising columns will be found a remarkable invitation addressed to the iron masters of Europe and America by the government of New South Wales. This prosperous colony is very rich in iron and coal of excellent quality. The government has within a few years constructed over 1,200 miles of railroad, and more than 500 miles are in course of construction, all the materials for which, except the sleepers, have been imported at a heavy charge in the way of freight, etc., from England. These charges should operate as a large "protection," and afford great inducements to enterprising men to embark in the manufacture of iron and steel in the colony. It is stated that 1,250,000 tons of iron and steel, inclusive of permanent way material, have been imported into New South Wales and Victoria within the last ten years. The government has determined to make a bold experiment to naturalize the iron industry in the colony, and has, in the terms of the notice which we publish to-day, called for tenders for 150,000 tons of steel rails (or any portion thereof) to be manufactured in the colony from New South Wales ores. Printed copies of preliminary specifications, conditions of contract and other particulars may be had from Messrs. R. W. Cameron & Co.. of New York, by iron masters and others desirous of obtaining authentic information on the subject.

THE railroad companies having their headquarters at Pittsburgh, Pennsylvania, held their annual meetings in that city on the 14th ult.

THE main offices of the Oregon Railway and Navigation Company have been moved to Boston.

Railway Matters in Canada.

SIR CHARLES TUPPER'S ANNUAL REPORT OF CANADIAN RAILWAYS—THE CANADIAN PACIFIC—THE GOVERNOR GENERAL'S SUGGESTION OF AID TO THE C. P. R. C.—OPPOSITION TO IT—MR. BLAKE'S OPINION—THAT OF THE MONETARY TIMES (TORONTO)—LORD LANSDOWNE'S HOPE—SIR JOHN MACDONALD'S PROPOSAL—MINOR RAILROAD MATTERS.

SIR CHARLES TUPPER'S annual report of Canadian railways and canals, shows that the several lines operated and maintained by the Government during the past fiscal year were, the Intercolonial, Prince Edward Island, and Windsor Branch, a total of 1,071 miles, the expenditures on which were $2,636,284, and the earnings, $2,541,204, a net loss of $95,080. Subject to approval by Parliament and by the Provincial Legislature of Nova Scotia, arrangements have been made under which the Dominion will retain the Pictou Branch and will acquire the Eastern Extension Railway, operating the same as a portion of the Intercolonial Railway. In relation to the Canadian Pacific Railway, the report says that the location of the road for a total distance of 964 miles west from Winnipeg, has been approved of by a series of Orders in Council, the last of which was dated the sixth of December, 1883. The obtaining of a pass other than the Yellow Head through the Rocky Mountains, contemplated in the original location, has long been an object with the company, and they have selected a line via the Kicking Horse Pass. The total length of the line passing through Winnipeg and the Kicking Horse Pass to Port Moody will be 2,888½ miles. There are also about 395 miles of branch railways in operation.

It may be remarked, in addition to these facts given in the report, that by the opening of navigation, the Canada Pacific Railway will have an independent route from the base of the Rocky Mountains to the seaboard. The Ontario and Quebec Railway will be ready for freight traffic before spring fairly opens. The route will then be from Montreal to Perth, by the Canada Pacific's own line; Perth to Toronto by the Ontario and Quebec; Toronto to Owen Sound by the Toronto, Gray and Bruce Railway; Owen Sound to Port Arthur by the company's new iron steamers, and Port Arthur to Calgary by the Canada Pacific Road. In the event of the Northern Railway falling into the hands of the syndicate, it is probable that Collingwood will be the starting point for the Canada Pacific steamers. In the meantime, the company is busily pushing forward the work of constructing a large grain elevator at Owen Sound.

The speech made by the Governor-General, on January 17, at the opening of the second session of the Dominion Parliament, was remarkable, as in other respects, for what was said of the Canadian Pacific. "Although," observed Lord Lansdowne, "the time within which the railway company is bound to finish the road will not expire until 1894, my Government has thought it of the greatest importance for the settlement of the Northwest and the development of our trade that its completion, from sea to sea, should be hastened, and the company enabled to open the line throughout by the spring of 1886. With this view, and in order to aid the company in procuring sufficient capital for the purpose by the disposal of its unsold shares, the Government agreed to receive a deposit of money and securities sufficient to pay a minimum three per cent. dividend for ten years on $65,000,000 of the stock. That arrangement was made in the belief that it would give steadiness and increased value to the shares in the market. A combination of unfavorable circumstances has prevented the fulfilment of the expectations, and the company has not been able to obtain the required capital by a sale of its stock. The best means of preventing any delay in the great object of the early completion of the railway demands your earnest consideration. I am pleased to be able to state that the operation of that portion of the railway already opened affords most gratifying evidence of its soundness as a commercial enterprise and of its great value to Canada."

The attitude of the Government towards the road, as stated in the above quotation, is provoking a great deal of discussion in the Canadian papers, with now and then a spicy hit at Lord Lansdowne's expense. Opposition to his proposal of rendering further aid to the company engaged in construction is wide-spread and influential. In the debate on the Governor-General's address, Mr. Blake contended that the Canada Pacific Railway Company had not fulfilled the promises made to the country, and hence that the people of the Northwest were directing their attention to the Hudson's Bay route, and he hoped the Government would aid the construction of that railway so as to relieve the people from the exorbitant charges made for transport over the Pacific Railway. Notwithstanding the boasted progress made in the construction of this railway, he contended that this progress was too rapid for the settlement of the Northwest and for the good of the country at large. He thought the announcement in the address of additional aid having been given to the company in the shape of a Government guarantee on their stock was of an alarming character, especially as this grave responsibility was undertaken by the Government for no better purpose than merely abridging the time for fulfillment of the contract, already too much accelerated; and he charged that the company had gone beyond the legitimate articles of the charter, and endangered their ability to fulfill their contract by investing capital in the purchase of branch railways.

The *Monetary Times*, Toronto, suggests that the road be mortgaged and sufficient money raised in that way, and opposes additional aid which "would ultimately add to the burthens of the people." Moreover, in the opinion of that journal, "rapid progress is not a question of life and death." So far as appearances enlighten as to the future, the probability is that laws will be devised and carried out for the completion of the road by the spring of 1886, thus, in the language of Sir John Macdonald, providing "a through all-rail route," when farmers "would not have to submit to the exactions of American railways." Lord Lansdowne seems to have set his heart upon this consummation. In his speech before the Toronto Club, he said: "I have been cherishing for some time past the hope that I may be the first Governor-General to cross the Rocky Mountains on Canadian metals." A new agreement with Government, proposed by Sir John Macdonald, contains a provision that it lend the Canada Pacific Railway Company, $22,500,000. On the other hand, the proposed agreement provides that the Government shall have the first lien and charge upon the entire property of the company, real and personal (with an exception specified), as security

for its loan falling due November 7, 1888, and that until the payment in full of the indebtedness of the company all moneys earned by the company as postal subsidy and for transport shall be retained by the Government, to be applied first, on account of the interest becoming due from time to time upon the loan hereby authorized, and then to the payment of interest. The severity of these conditions will probably disarm the opposition to some extent. The size of the elephant fostered by the Dominion Government, is indicated in the fact that up to June 30, 1883, it had spent $36,098,842 on the Canadian Pacific Railway.

Some minor items of news are that the track on the Napanee, Tamworth and Quebec Railway has been laid eighteen miles from Napanee, or to within ten miles of Tamworth; a railway bridge is projected across the St. Lawrence at Quebec, for the use of the New Brunswick trade; the Canadian Pacific Railway Company's telegraph line is to be extended from Algoma Mills to the Michigan Sault by submarine cable; and President H. B. Ledyard, of the Michigan Central, says that the Canada division will not be double-tracked until there is more business than at present.

Letter from Mexico.

ACAMBARA, MEXICO.

THE Mexican National Construction Company are pushing their road forward to its terminus on the Pacific Ocean. A short time back it was extended to Morelia. The inhabitants were much delighted, and received the officers of the company with the firing of cannons, music of bands and great enthusiasm. The north and west divisions to Morelia and Celaya, promise a large increase of traffic, both in freight and passengers, and thus augment the receipts of the road and add to its prosperity financially.

Opportunities for traveling and transportation will soon build up a trade here that will astonish the dons of this, for a long time, almost inaccessible part of the world. The old diligence will soon be one of the things of the past, like the stage coaches of the United States.

This town may become in time a noted watering place. The water flowing from the hot springs is very abundant, and so hot that it steams very considerably, even in the hottest days. It is as clear as crystal and very healthy for bathing. Just what its medicinal qualities are has not yet been ascertained. The town is situated in the valley of the Lerma. This is not much of a river in this land of rivers, but certainly better than many in the old continent; for instance, the Manzanares, on which Madrid, the capital of Spain stands, which has been the subject of much witticism. A German ambassador asserted that it was the best river he had ever seen, as it was navigable either on horseback or by carriage; and when Napoleon's army entered Madrid, they exclaimed: "What! has the river run away too?" But to get back to Acambara. One of the high hills near the town affords a most magnificent "vista." Sitting on the sharp point of a rock projecting from this hill, it seems as if one could almost toss a stone into the middle of the plaza. Winding away off in the distance is spread the rich valley of the Lerma. The ancient town, just at our feet, seems to be an exquisite piece of mosaic, its Moorish domed churches and high bell towers patterning themselves from among the green trees. The queer narrow streets and flat-tiled roofed houses, show more like a picture than reality. At the north end of the town is an old grey convent, whose high-barred windows look into a paved court. About a square nearer is the Cathedral in the center of the town, with its high, solid bell tower, cold and gray against the warm, green background of the trees of the little parks, and one can hear the deep tone of the great bell, slowly tolling for some departed soul, and almost imagine that one catches the dull tone of the priest as he performs his solemn duties. The Plaza (market) dotted over with white sunshades and booths, seems alive with animated pigmies. One just hears an unintelligible murmur, but understands that the busy folks below are wrangling for their week's supplies and Sunday dinner, for Sunday is the market day of the week. "How much do you give?" "Here you are, sir; have the goodness to notice how I have heaped the measure." "Don't you give any more than that for a quartille" (3 cents)? "Can't you put on just one more piece? oh! I am very poor." "Well, have it; may the Lord forgive me for taking the bread out of my children's mouth." And so it goes on.

A quaint old Mexican air floats up from the bull ring as the band advertises a fight in the Plaza de Torres, mingling with the merry voices of the children as they gather around it.

From the foot of the hill springs away with bold curve past the town, the muddy river, performing various contortions before it disappears on the opposite side of the plains. The principal street, after winding past church and Plaza, passes majestically over the river on a grand old stone bridge, which joins the shores with twenty solid stone arches, rising high in the middle and sloping to either side. This solid piece of masonry for over two hundred years has looked down upon the tree tops and muddy waters beneath, on the merry copper-colored youngsters, as they romped and splashed in the water, while their mothers washed the only apparel that blessed their little backs. Nothing changes in this land; as they do now, so did their ancestors for generations before.

The line of the Mexican National Railway, sweeps between the town and river, and then spreads its arms north and west. That little column of smoke rising in the south is the City of Mexico express train descending into the valley of Tepetougo, fifty miles to the south. That white stream just over the ridge to the west, is Largo (Lake) Quitzro, whose salty waters spread for forty miles along the foot of the mountains, while high, conical peaks springing up in the very center, cast long, dark shadows across its briny waves. The bald-headed eagle floats slowly by. The Indian boy with his dogs and goats comes creeping up the hill side, to pastures ever green. I lie entranced, breathing forth reminiscences of home and friends in fragrant clouds of smoke, slowly and lazily drinking in the lovely scenes below me, oft wondering if I shall ever find enough of the bright dust to take me back to the life I left.

J. O.

AN exhibition of arts, manufactures, and scientific, agricultural, and industrial products will be opened at the Crystal Palace, Sydenham, near London, on the third of April next, and will continue open six months. Americans are invited to exhibit.

Our English Letter.

WRITTEN SPECIALLY FOR THE AMERICAN RAILROAD JOURNAL.

YOUR contemporary, *Herapath's Railway Journal*, talks very plainly about a class of business men, with whom you, Mr. Editor, have a great deal to do; and I quote the passage to give you an opportunity of reply, if you feel like it. "It is an unhappy characteristic of American railroad men," remarks the above-named venerable paper, "that they never know quite exactly when to stop, and that they are either proceeding with the work of construction at a headlong rate, or are suffering from a panic brought about through their own folly." Of course you are more concerned with the charge itself than with the manner in which it is expressed; and from what I have observed of the AMERICAN RAILROAD JOURNAL for a long time, you are too sturdy an "institution" to split hairs about questions of mere phraseology, especially when, as in this case, irregularities in railroad operations on your side of the "herring pond" have a marked influence on the money market here. How could it be otherwise than that Herapath should complain, when the depreciation of American railroad securities in 1883, amounted to $230,000,000?

John Bull, moreover, finds an additional occasion of grumbling in the large number of "bubble companies" originated within his own little domain. The figures I am about to give will startle your readers, especially should they be under the delusion that the august gentleman I have named, does business, generally speaking, on a sure basis. Nearly twenty thousand companies were registered from 1862 and 1882 (inclusive), of which only 8,838 were alive at the end of the second of these years; which is the same as saying that fifty-five per cent. had burst during the brief space of twenty years. Whether or not legislation should aim at the prevention of commercial bubble-blowing is a matter which our statesmen may be called upon to consider. There is something to be said on both sides. If it is claimed to be proper and reasonable to protect the public against adventurers who get up ephemeral companies, it is unquestionably true that people should be exceedingly careful as to how they invest their money; and perhaps the teachings of experience, in this particular matter, may be more salutary in the community than the meddling of legislation. I give it up.

If you have not already noted the publication in *Temple Bar*, of an article on "Our Fastest Trains," you will be obliged to me for directing attention to some of its very interesting statements of facts. The writer says that nearly half a century ago Mr. Brunel held that the speed of one hundred miles an hour was possible under favorable circumstances, on the broad gauge, and was all but attained between London and Bath. "In 1846, on the South Devon Railway, then worked on the atmospheric principle, a speed of upwards of seventy miles an hour was obtained on an experimental trip from Exeter to Starcross, without the use of a locomotive." The following has a disagreeable interest to Americans, but I will nevertheless venture to quote it: "When peace or war were in the balance, a special engine was kept for a whole week at Holyhead waiting to bring up the United States dispatches on the Trent seizure. On their arrival at Holyhead they were immediately forwarded to Euston by a special train over the London and Northwestern Railway, which covered the 264 miles intervening in five hours without any delay or stoppage on the road, other than a few minutes in pausing to change engines at Stafford." The well-informed author has his opinions. He says: "The superiority of the broad to the narrow-gauge (and of the longitudinal to the cross sleeper) for speed, safety, and comfort is beyond dispute." Continuing his observations on the Great Western, the only broad-gauge line in England, the writer says: "It forms a compact organism of 2,300 miles (the largest in the kingdom) with first rate carriages and permanent way. It has the smoothest running track in the kingdom, and the speed between Paddington and Swindon is the highest of any long run in England. The fastest trains on the Great Western are naturally the broad-gauge ones (to the West of England); and those leaving Paddington at 11.45 A. M. and 3.00 P. M., with the two corresponding up-trains, are the quickest in the world, allowance being made for time stopped at stations on the road. At some of the stations they pass on the road these trains are literally timed to the second in the running time books, the quarter-minutes being given." These quotations from an article full of interest, must be of service in every country where increased speed in railway traveling is a consideration of importance.

Speaking of high speed reminds me that Mr. F. Hahn Dauchell, a civil engineer of London, proposes to run his electrical motor at from one hundred and fifty to two hundred miles an hour, but not to take passengers, limiting transit on his railway to letters and parcels. His system has been given a trial, which proved satisfactory. It provides two rails, one above and one below the train, the former to convey the electric current and prevent the train running off the rail, and the latter for the train to run upon, at the almost incredible speed named. The wheels of the motor are of great diameter. They are grooved, and run in line with each other.

This wonderful London of ours has unmatched provision for local travel. Omnibuses, cabs, the underground railway, and other facilities, increasing, as you free-speaking Americans say, "all the time," make "getting around" in the metropolis, cheap and easy. The vast traffic to and from this largest, noisiest, and busiest of cities is provided for by fourteen strictly terminal railway stations—you would call them depots—from which 2,202 trains depart during every twenty-four hours.

There may be something of practical utility in my closing this letter with a few figures anent a temporary bridge, consisting of four steel arches, which has been thrown across the River Spey at its widest part between Fochabers and Gartmouth to accommodate the workmen engaged in building the Moray coast line for the Great North of Scotland Railway. The span is five hundred feet wide, and the four cables serve as guides to a lattice iron carriage weighing one hundred and forty pounds. The four upper wheels of the carriage have each a crank attached, to enable the passengers to propel the car up a short incline of forty feet at the end of each journey. The remaining 460 feet are traversed by the impetus given the car by gravitation. Mr. Harper, of Leafield, is the designer of the bridge.

H. A. L.

THE Old Colony Railroad is seeking leave from the Massachusetts legislature to double-track its road.

A RETROSPECT:

BEING

A Complete History of Railroad Progress in America.

Compiled from this Journal, beginning Fifty-two years ago.

CHAPTER II.

CONTAINING AN ACCOUNT OF THE ORIGIN AND BEGINNING OF THE BALTIMORE AND OHIO RAILROAD.

No. 2, Vol. I, of the AMERICAN RAILROAD JOURNAL is dignified with a new pictorial heading, being a sketch of the steam carriage employed on the Hetton Railway, with tender and two wagons attached to it. The tender is an odd-looking object, with its old-fashioned water-barrel. This quaint old cut did duty in the capital position of the AMERICAN RAILROAD JOURNAL, from January 7, 1832, to the last issue of that year, after which it was superseded by an illustration, showing, among other things to be mentioned in due course, that the water-barrel had given place to a tender forming part of the locomotive itself.

The "History and Progress of Railroads" contains here and there a remark most quaint in the light of subsequent developments. How deliciously patronizing, for example, it appears to say of Robert Stephenson, that his "inquiries into railroad conveyance have been pretty extensive!" But fifty-two years ago Stephenson's best work was not yet done. With the exception of here and there a quotable phrase like this, the series of papers constituting the "History and Progress" is nowise remarkable, beyond its faithfulness as to facts, and modern readers are pretty well acquainted with these.

In the beginning of January, 1832, the Baltimore and Ohio Railroad was already "in the fourth year of its progress, and in spite of great difficulties and greater doubts at its outset," presented "the longest continuous line of railroad in the world." Our editor remarks of it, with what the typos call a double screamer (!!) as follows: "It would seem, from experiments already made on this road, that there is no reason to doubt that the travel on it may be safely carried on at the rate of from twelve to fifteen miles an hour, by the aid of steam power, and that passengers may be conveyed from Baltimore to the Ohio River within from twenty-four to thirty hours, at all seasons of the year—a distance little short, we believe, of 350 miles!!" Moreover, one "remarkable circumstance" "of most encouraging augury" was, "that on the whole line only two summits occur, where the employment of stationary engines will be necessary. On the rest of it, locomotive engines will be able to travel efficiently."

The fifth report of the Baltimore and Ohio bears date December 20, 1831, and has the signature "Philip E. Thomas," president of the company. Hereafter are valuable extracts from this valuable document, accompanied with such remarks as may be suggested by its perusal:

"The railroad has been opened for travel as far as to Frederick, a distance of sixty-one miles from the depot of the company at the head of the basin in the city of Baltimore; a single line of tracks has also been so nearly completed to the 'Point of Rocks,' on the Potomac River, as to afford a full assurance that the communication between the tide waters of the Chesapeake bay and that river, will very soon be opened through this channel." Such gratifying results had grown out of a state of feeling based upon superior political sagacity. In President Thomas's own words: "The establishment of an efficient, speedy and economical means of inter-communication between the different sections of our country, had been for a long time deemed of such importance, as to involve, not only the well being, but perhaps the very existence of our social compact." Actuated by this conviction, the citizens of Baltimore aspired to take their part in further compacting the Federal union, and besides to augment the commercial importance of their city, by securing a more direct and easy means of communicating with the valleys of the Ohio and Upper Mississippi. Their original idea was to do this by means of a canal between the Ohio River and Chesapeake Bay. When in the course of time, the United States engineers intrusted to make the proper researches, had reported on this project, Baltimoreans "saw, with dismay, that a canal encumbered with six hundred locks, a considerable portion of which would be elevated from twelve hundred to more than two thousand feet above the tide, and which would be sealed up with frost three or four months in the year, with only a limited and precarious supply of water in summer, must be wholly inadequate to the demands of the immense trade it was destined to accommodate." But the bad outlook in the one direction led these wide-awake folks to seek for a more promising enterprise than that presented by it. Accordingly a meeting of citizens of Baltimore was held, February 12, 1827, at which the capabilities of railroads as means of inter-communication superior to canals and turnpike roads were considered, as shown by various documents and statements; and a committee was appointed to further consider said documents. This committee did its work with commendable industry. It "subsequently reported a mass of facts, derived principally from English authorities," and in its judgment, warranting the recommendation: "That measures be taken to construct a double railroad between the city of Baltimore and some suitable point on the Ohio River, by the most eligible and direct route, and that a charter to incorporate a company to execute this work be obtained as early as possible."

No time was lost in acting upon this comprehensive recommendation. "The legislatures of Maryland and Virginia, then in session, with a promptness which entitles them to the public gratitude, concurred in an act, incorporating a company as desired, and investing it with ample powers. This act was subsequently acceded to by the legislature of Pennsylvania in the same liberal spirit." As provided by the State of Maryland as a condition to the stock of the company, the road was so located, "that it shall go to or strike the Potomac River at some point between the mouth of the Monocacy River and the town of Cumberland, in Allegheny county, and that it shall go into Frederick, Washington, and Allegheny counties." Subscriptions for stock were opened; the amount required by the charter was immediately filled; a board of directors elected, and work begun in the fall of 1828. The ceremony

of laying the first stone had been performed with patriotic jubilations on the previous fourth of July. Having reviewed the difficult engineering already accomplished with the aid of several improvements invented by "the genius and science of American citizens," the company, through its president, expresses, without doubt, its belief "that the graduation, masonry, and construction with a double set of tracks may be accomplished between the present termination of the road and the Ohio River at or nearly within the original estimated cost of twenty thousand dollars per mile, and that in the event of the requisite funds being placed at the disposal of this company, the whole work might be completed and put into operation in five years."

President Thomas ends his report with the prophecy that the State of Maryland "will soon find herself, in point of commercial activity and capital, second to no State in the Union," "by securing to herself the channel through which the interchange of commodities between the eastern and western States will mainly pass, and which her position gives her an opportunity of effecting." Mistaken in this expectation—the writer hopes Maryland will pardon the remark—it may also be forgiven that President Thomas did not anticipate the time when an express train would run from Paris to Constantinople, and when on our own continent, Canada, the United States and Mexico would present a continuity of communication by means of railroad. At the same time his patriotic anticipations are being increasingly manifested in the United States. President Thomas, as the document under review demonstrates, was a far-sighted man, who loved his country dearly, and his work all the more because it anticipated its unprecedented progress, and that unity of interests between its States which is the surest bond of permanent union.

"It is certain," he says, "that whatever advantages may be anticipated from the railroad system in Europe, they will be of minor importance when compared with the benefits we are destined to derive from the introduction of this system into our country. By the easy, convenient, and rapid intercourse which these roads afford, they are capable of placing, almost in juxtaposition, the most remote sections of our widely extended republic, and will thus do more to perpetuate our institutions and preserve our Union than any political compacts or physical force could ever effect. The system, if advantageously applied and sufficiently extended, will give to the people of the United States an identity of feeling, or harmony of interests, and a facility of social intercourse, which must long bind them together as one great family; and to secure to our country all the advantages resulting from the productiveness of a mighty continent, with the conveniences of communication incident to a small island."

In an earlier part of his report, President Thomas remarks that the ordinary speed attained upon the Liverpool and Manchester Railroad, at the time he penned it, was from fifteen to thirty miles an hour; "and," he adds, "it is even asserted, that the whole distance of thirty-two miles, between these places, has been run in thirty-three minutes, or at the rate of fifty-eight miles per hour." It appears from this statement that in the matter of speed the attainable then was about equal to the attainable now, a fact patent to every well-informed reader.

(*To be continued.*)

Coming Exposition at New Orleans.

THE Cotton Centennial Exposition, to be opened at New Orleans on the first Monday in December, 1884, and closed not later than May 31, 1885, will have a class of railway apparatus, divided as follows:

Plans, models, drawings, surveys, etc.; permanent ways, station arrangements. Models of engines, of systems of traction, of apparatus pertaining to railways. Models, plans, and drawings of platforms, stations and engine-houses, and other buildings necessary for the working of railways. Separate parts—Springs, buffers, couplers, combined coupler, buffer, and platforms, brakes, trucks, snow-plows, pilots, wheels, tires, axles, bearings, ties, chairs, switches, rails, crossings, fish-plates, turn-tables, feeding-cranes, tanks, boltless rail joints, automatic railway signals. Locomotives, tenders. Rolling stock—Passenger cars, sleeping cars, dining cars, buffet cars, freight cars, refrigerator cars, smoking cars, stock cars, construction cars, hand cars, inspection cars. Automatic brakes for freight trains, power brakes for trains, speed and distance indicators, automatic bell-ringers for locomotives, throttle-valves, portable jacks, optical and acoustic signals. Miscellaneous locomotive attachments. Special tools and machines for the maintenance, repair, and construction of railways. Railway machinery and supplies of every description. Apparatus and system for inclined planes and self-acting planes. Apparatus and engines for atmospheric railways. Permanent ways for street railways; apparatus and systems of street railways.

CONSUL-GENERAL SCHUYLER, of Athens, writes that the government of Greece has called a commission of French engineers to decide upon roads and to survey for railways. It is proposed to make several networks of roads, and to intrust their building to contractors taken from various countries, so as to entice foreign capital into Greece. Up to the present year but one railway has existed in Greece—from Athens to the Piræus, a distance of five and a quarter miles. A few months ago another short railway was opened on the western coast of Peloponnesus, from the port of Katakolo to the town of Pyrgos, eight miles. A railway is now in course of construction from the Piræus and Athens, to Patras by the way of Corinth, about 136 miles, and it is expected that it will be opened from here to Eleusis in the autumn. Another railway is projected from Athens to the mines of Laurium, thirty-six miles. The concession has been given, but no work has yet been done. Work is being actively pushed on the Thessalian railways from Volo, the chief port, to Larissa, the capital of the province, with a branch from Velestina to Kalabaki; in all, 128 miles. This is to be part of the great railway line which is to connect Athens with the rest of Europe. A connecting link will be made from Athens through Lamia to the Thessalian railway. It is expected that the same company will build a railway on the Turkish side of the frontier, connecting Thessaly with Salonica and the railway which now runs from that point northwards, and is shortly to be prolonged to Belgrade and Vienna. Two lines of tramway have been laid down in Athens, and a steam tramway from Athens to Phaleron.

THE Texas and St. Louis Railroad has passed into the hands of a receiver.

Lubricating and Lubricants.

BY E. F. DIETERICHS, CLEVELAND, O.

III.

TESTING LUBRICANTS.

THERE are many methods resorted to for testing lubricants as to their relative value as such. The testing machines in general use enable us to decide, with some degree of correctness, how far a lubricant recommends itself for practical use without fear of causing injury to the machinery. Such tests, however, are necessarily on too small a scale, and the time too limited to permit ascertaining correctly the merits or demerits of a lubricant for regular practical use, and the effects from interfering influences, as for instance on a locomotive, such as the scorching heat of the sun in summer, the sudden chilly blasts of cold in winter, the constant and irregular vibration, snow and hail and the flying cinders and dust acting on the lubricant. These can only be determined by practical and prolonged use.

Some of the animal and vegetable oils will outrun the best mineral oils on a testing machine, yet under practical and prolonged use can barely hold their own on account of their liability to decomposition under the influence of frictional heat, and the above-mentioned interfering influences. As cylinder oils, fatty matter is still more subject to decomposition, undergoing in the cylinder of an engine precisely the same treatment of exposure to steam under pressure as is resorted to in the process of manufacture of stearine and the fatty acids. From the small quantities thus decomposed at a time in a cylinder, the accumulations become perceptibly troublesome only after some time, and no testing machine can demonstrate this important fact on so limited scale and short test.

Lubricating is a chemical process. If the theory were correct that cushion-forming metallic and inert matter can relieve continuous friction, then lubricating would be a purely mechanical action, which it is not; but as thorough lubrication involves the vaporization of interposed substances, that is, the passage of matter from the solid or liquid to a gaseous state, and we have to make use of this chemical property of a change of state in order to relieve the moving metallic surfaces from frictional heat, we are bound to consider lubricating as a chemical process, not a mechanical one, and we can therefore judge the efficiency of a lubricant by its chemical characteristics and by the chemical influences which in practice it is exposed to.

The lighter and more essential fatty acids from the different fatty matter represent the odor peculiar to each oil or fat respectively; the more rank (that is decomposed) they are, the more prominent is their characteristic odor. They do not become rank as easily in cold as they do in warm weather, and thereby show that little heat can decompose them and set their acids free. The slight amount of frictional heat produced by rapidly rubbing the hands together will start their acids, and a small amount of oil or fat thus rapidly vaporized will enable us to recognize most of them by their peculiar odor, and thereby also detect the presence of free, fatty acids. Chemistry teaches us that all fatty matter can be saponified and can be decomposed, and its component parts separated by the influence of steam and pressure. When we therefore ascertain the presence of free, fatty acids in a cylinder lubricant by the frictional heat created by the rapid rubbing between our hands, we can safely surmise that such lubricant must undergo like decomposition in a cylinder. If the odor indicates the presence of light hydro-carbons, we can surmise that the constituents of the lubricant are too volatile to be safe for practical use. If the odor is a neutral one, that is such as not to indicate any one particular odor, we can surmise that the lubricant is made of heavy hydro-carbon oils or such in connection with fatty matter unable to vaporize as light hydro-carbons or as free fatty acids.

By pouring a drop of the samples to be compared on clean and close blotting paper, we can, by the slow or rapid penetration, judge as to their difference in viscosity as well as to their difference in purity, as the more limpid or too light oil will run through faster, and all tarry or inert matter will be left behind long after the limpid part of the sample has passed through or has diffused itself along the paper.

Pouring some of the lubricant to be tested on to the warm slides or bright surface of an upright engine, the more rapid descent of the one or slower flowing of the other, will indicate their superior or inferior clinging power at elevated temperature, and their respective cleanliness by the trail they leave behind.

As a preliminary test engineers often pour a few drops of an oil to be examined on to the hot plate of the cylinder-chest, and call it a poorer oil for evaporating faster than another, yet we prove thereby only that it possesses a lower fire test; we may there also show its diffusing or diffusion resisting property under heat, its resinous drying character and its liability to decomposition, but what reliable inference can we draw from all this as to qualification for cylinder lubricant when we consider that the heat on the cylinder-plate is a dry and scorching one, while inside, where the lubricating is to be done, the heat is a moist one, and while resinous deposits from oils containing resinous matter may be shown on the cylinder-plate, even from a small quantity, the gummy deposits left from lard oil and like oils inside a cylinder will escape detection? nor can we ascertain thereby what fire test would be most appropriate for cylinder oils. For railroads, the setting apart of an engine expressly built for the purpose, and supplied with all necessary contrivances to ascertain sudden and progressive heating, all parts so arranged as to increase or relieve tension at will, provided with feeding facilities easily changed or made adaptable and practicable for all kinds of lubricants it may be desirable to test, and above all in charge of an intelligent operator, theoretically and practically well-informed on the subjects of machinery, lubricating and lubricants, would by far be the most efficient and economical testing machine. While at the same time performing some regular work, testing and recording could be carried on, and most practical results and an endless amount of information on the subject of lubricating and lubricants, and the many ways of doing it, could be obtained.

For want of new tests to be made, and while running with the lubricant in use on the road, the constantly observing and recording engine would detect all fraudulent changes as to quality of the lubricant periodically supplied for the road, and would set at rest all one-sided complaints as to shortcomings from causes entirely for-

eign to it. A similar plan could be adopted by all large manufacturing establishments where a number of stationary engines and lots of duplicated machinery are in use; and even in smaller establishments a particular bearing could be selected and fitted for the purpose, under exclusive control of an intelligent and trustworthy operator.

(*To be continued.*)

MEXICAN NOTES.

Adapted from the Mexican Financier.

THE President of Honduras has granted a very valuable railroad concession to three New York capitalists, William H. Warner, H. K. Wheeler, and M. O. Sheldon. A land grant of eight square miles on each side of the track for each mile of road constructed is to belong to any company organized by these gentlemen, and completing a railroad by August 1, 1887, from Trujillo, a seaport of five thousand inhabitants to the Roman River, a distance of twenty miles. The road is then to extend for a distance of fifty miles up the Arenal valley. It will traverse a country very rich in cabinet and dye woods.

A CONCESSION has been granted to General Alonso Flores for the construction of a railway line from Tampico to Victoria through Altimara, Presas, the hacienda of Santa María and La Sierra, with the branches necessary for local traffic; also from Victoria through Hidalgo and Rio Blanco, terminating in Matehuala with a branch to Padilla, and other branches which may be necessary. The gauge may be either narrow or broad. A subsidy of $4,500 a kilometer of narrow-gauge track is granted.

THE action of the Government, in relation to the approaching world's exposition in New Orleans, commends itself to public approbation. General Porfirio Diaz will without doubt act personally as commissioner general from Mexico, and Messrs. E. G. Gillow and Mariano Bárcena have accepted their appointments as commissioners to act in conjunction with Mr. G. H. W. Timbrell.

THE concession to Gen. Carbó for the construction of a railway from Mazatlan to Rosario in Sinaloa, with an extension to a junction with the Mexican Central in the District of Tepic, is regarded as a highly important and valuable one, and will give the Pacific line of the Central access to the leading port on the Pacific coast.

THE Mexican Central is building its own freight cars, the frame work being of oak from the company's forest at Nardo, while the pine comes from the forests near Pátzcuaro in Michoacan, whence it is hauled to the Mexican National at Morelia and delivered to the Central at Celaya.

A CONCESSION has been granted to Mr. José Matilde Alcocer for the construction of a railway from the port of Celestun in Yucatan through Merida and Hunucmá to Sotuta, with a branch to Teabo, with a subsidy of $5,500 a kilometer.

THE Mexican Navigation Company's steamship Estéban de Antunano, to ply between Vera Cruz, Galveston and New Orleans, is being built in Sunderland, England. The ship, which is to cost $160,000, is to be finished in September.

THE hotel being built by the Atchison, Topeka & Santa Fé Railroad Company at Guaymas, will be a fine structure and will probably rival the company's grand hotel at Las Vegas Hot Springs in the completeness of its appointments.

THE cities of Mazatlan and Rosario have granted a concession of $2,000 a kilometer to the railway company chartered to build a line between those two important places.

PULLMAN sleepers will be used on the Mexican Central Railroad, from El Paso to the city of Mexico, after April first.

JAMES H. LANCASTER, of No. 36 Dey street, New York, president of the Lancaster Manufacturing Company, has purchased the entire plant, patterns, and good will of the business of J. H. Darlington, (Harlem Railroad Depot), corner Centre and Franklin streets, New York. This business was founded by Mr. J. H. Darlington, some thirty years ago, and has been in successful operation ever since. The present plant and patterns cost Mr. Darlington upwards of thirty thousand dollars, and to this Mr. Lancaster will add considerable additional machinery, including Universal Milling Machines, Monitor Lathes, and a complete set of emery, grinding and polishing machinery. In addition to the general work hitherto carried on at these works, Mr. Lancaster will build his new patent Caloric Motors and Caloric Pumping Engines, Drop and Trip Hammers, Dynamo Machines, Arc Lamps, Steam Engines, and also such work of the Lancaster Manufacturing Company, as this plant is suited for. New floors (120 feet by 25 feet) are being laid, and every preparation is being made for increasing the manufacturing facilities of the concern. About fifty men will find employment at these shops. At present the business is being conducted solely by James H. Lancaster, but it is intended by him to organize a stock company, capitalized at $500,000 and styled "The J. H. Lancaster Engineering Company." The directors of this concern will be men of high standing in the mechanical world. This business will be conducted distinctly from that of the Lancaster Manufacturing Company, which was successfully founded by Mr. Lancaster some eighteen months ago.

THE advertisement of S. C. Anderson, No. 93 Duane street, New York, in the present issue, is important to railroad and all other great business interests. It directs attention to Zuccato's Papyrograph, a copying machine in use by the American and United States Express companies, the Equitable Insurance Company, the New York Board of Health, the Department of Public Works, New York, the Manhattan Railway Company, H. K. & F. B Thurber & Company, etc. This machine enables an office boy to take autograph copies of any letter at the rate of four hundred per hour. Its applicability, moreover, in multiplying circulars, price lists, specifications, designs, notices, postal cards, envelopes, or manuscripts of any description gives it an unequaled range of usefulness. All copies made by its means are perfect. We confidently advise correspondence with Mr. Anderson.

THE difference between the trunk lines and the Lackawanna has been compromised by the provision that the latter shall enter the pool, and differences between it and the trunk lines shall be settled by a new board of arbitration in the place of the regular arbitrator.

Hints from Recent British Patents.

A NEW rail for railways and tramways is built up of two similar sections, having a somewhat Z shaped section, giving four perfect and independent flanges. In certain railway brakes and springs a steam piston and cylinder are opposed by a vacuum piston and cylinder, the two pistons being on the same piston rod; when the vacuum is destroyed in the main pipe, the steam applies the brake, and when the vacuum is again formed it overcomes the steam piston and takes off the brakes. Tickets to be issued to passengers in public conveyances have counterfoils, and are dated, etc; they are strung on a wire, one end of which passes into a locked drawer in the money-taker's office in such manner that the counterfoils pass into the drawer as the tickets are sold, and thus act as checks. A system of railway signaling and apparatus and fittings connected therewith shows mechanism, which will slide an arm carrying detonating signals over the rails and withdraw it, and which is combined with the mechanism working the "semaphore" signals. A railway ticket is composed of two pieces of card united on three sides, forming a convenient receptacle. In an improvement for use in electric railways, the armature of the dynamo motor is made of larger diameter than that of the driving wheel, the object being to dispense with gearing; the track has a depression between the rails, which allows of the passage of the armature. In new railway carriage lamps, the gas jet or flame inclosed in a small air-tight glass of semi-globular form is arranged at the lower extremity of a chimney having a suitably protected outlet for the products of combustion and consisting of a tube having a number of longitudinal folds or corrugations; this chimney is inclosed in an outer tube of heat-retaining materials and is provided with protected inlets for air. As a system and means for communicating between trains in motion and between trains and stations, a contact wheel is mounted in the forked end of a rod whose other end is embedded in an insulating substance inclosed in a box bolted to the engine; the contact wheel runs on an insulated rail or conductor laid down between the rails, and makes contact therewith. To secure rails in the permanent way of railways, one of the jaws is removed and the remaining jaw is strengthened externally; the base of the chair and the inner jaw are hollowed out to receive the rail, and the base receives a movable jaw or clamp.

IN Mr. Edwin Hutchinson's report on color blindness, addressed to the railroad commissioners of New York State, to which reference was made in the January issue, the learned writer pays a handsome tribute to Dr. B. Joy Jeffries, of Boston. To him, he says, "the thanks of all citizens are due for his untiring energy in investigating the subject of color-blindness. He, through his valuable book, and in lectures and written articles, has done more than any one else to awaken public interest in the dangers which arise from this cause. It is but just to Dr. Jeffries, as the pioneer of the movement in this country, to state that what he has claimed as necessary, and has always argued for, is simply the legal enactment of standard requirements of visual power and the color sense, adjusted to the several positions of employés, these standard requirements to be tested for by standard methods, through competent experts legally appointed."

WE have received the report of the Committee on Uniform Train Signals, for the use of the railway lines of the United States and the Dominion of Canada, made to the General Time Convention, Chicago, October 11, 1883, and published by order of the convention. It contains the recommendations of the committee on hand and lamp signals, bell-cord signals, whistle signals, stationary and fixed signals, torpedo signals, and the use of signals. The valuable pamphlet under review is published by the National Publication Company, No. 46 Broad street, New York. Copies are forwarded to the officers of railroads on application to the secretary, W. F. Allen, same address.

THE Railway Specialty Manufacturing Company, No. 30 Vesey street, New York, are making Horne's Safety Switch Stand, which is used on some of the leading railroads of the United States. It is strongly and simply constructed, and consists of but four pieces, put together with three bolts; size, two feet long by two feet high, and weighing, complete with targets and connecting rods, 260 pounds. We learn that after ten months of service, it is found to give entire satisfaction.

EX-JUDGE ERNOTT has given Judge Green, receiver of the North River Construction Company, an opinion upon the question, as to what effect any lien by contractors, laborers or material men, under any statute, could have upon the right of bondholders under a first mortgage of the New York, West Shore and Buffalo Railroad Company, declaring that no lien can disturb or obtain precedence of a lien created by an existing first mortgage, by which outstanding bonds are secured.

THE arguments of Mr. James E. Gowen, Mr. Franklin B. Gowen, Hon. George M. Robeson, and Hon. B. Williamson, counsel for defendants on the motion for a preliminary injunction, in the case of Dinsmore *vs.* The Philadelphia & Reading Railroad Company *et al.*, delivered in the United States Circuit Court at Trenton, New Jersey, in November, 1881, have been published at Allen, Lane & Scott's Printing House, Philadelphia.

RAND, AVERY & COMPANY, of Boston, will publish in the coming spring, a story "involving the pregnant question of Mormonism." Their belief is that "the thrilling and powerful tale" referred to "will hasten the day for the uprising of an indignant nation, and their verdict will be as in the case of slavery—this disgrace must cease—the Mormon must go!"

IT is stated in a San Francisco journal that Attorney-General Marshall is inclined to abandon the tax suits against the Central Pacific Railroad Company and accept the proposition of the company's attorney, Mr. Haymond, to pay the full amount of taxes for 1880, 1881 and 1882.

THE Burton Stock Car Company, Boston, is building two of their patent stock cars for one of the Australian governments, to be used as samples. If found satisfactory, one hundred more will be built for the same destination.

THE railroad commissioners of Kansas have ordered a reduction in freight rates by all roads in that State, of from nine to forty per cent., an average of about fifteen per cent. on the entire classification.

THE National Tube Works Company have leased a large storeroom at No. 802 North Second street, St. Louis, and open to the trade a full line of pipes, tubes, etc., ready for prompt shipment.

Tramway.

American Street Railway Association.

President.—William H. Hazzard, Brooklyn, N. Y.
First Vice-President.—James K. Lake, Chicago, Ill.
Second Vice-President.—George B. Kerper, Cincinnati, O.
Third Vice-President.—D. F. Longstreet, Providence, R. I.
Secretary and Treasurer.—William J. Richardson, Brooklyn, N. Y.
Office of the Association, cor. Atlantic and Third Avenues, Brooklyn, N.Y.

THE TWELVE HOURS BILL.

THE Assembly now in session at Albany has revealed the stuff it is made of, by passing to a third reading, a bill which provides that street railroad companies shall work their employés not longer than twelve hours a day. or, if longer, pay them extra compensation. As only twenty-eight members voted against the passage of the bill, and were defeated by odds of more than three to one, the division indicated an overwhelming preponderance of allied stupidity and demagogism in the lower house. In this respect, New York may not be worse off than her sister States. Intelligent citizens here, as elsewhere, appreciate the advantage to the commonwealth implied, as a general thing, in the absence of honorable members from their duties at the Capitol. When its doors are closed business men feel at rest from the mischievous meddling which, in these degenerate days, passes for statesmanship, and is too often the parent of legislation. In the particular matter under consideration, there remains hope that the bill will get no farther than it has already proceeded; and as the debate preceding its passage to its present stage, considered as a whole, was a first-class "circus," there seems to be wisdom in thus regarding it, and in enjoying to the full the mirth its perusal abundantly affords.

And this in spite of the temptation to moralize on the contemptible want of principle evidenced by men who posed as friends of the working-classes, and cast their votes on the catch-vote system. Not that we believe the majority in the division to which reference is made, was composed exclusively of such persons. There probably were some who gave an honest vote, and conscientiously believed themselves to be, and undoubtedly were, actuated in that sublime act, by a humane regard for their over-worked brother man, the conductor or the car-driver. But it is surely laughable that such men as these, sent up to Albany to legislate in the interests of the Empire State, however big their heart, have not head enough to perceive that the attempt to govern the relations between employer and employed, both being free agents and adults, is a mischievous interference with business, and, if successful, would furnish a precedent for endless interferences of the same kind, injurious to the interests of the entire community. The argument as cleverly put by some speakers of the minority, is simply unanswerable, and would be irresistible if presented to persons other than those who either have a method in their madness or unhappily want the ability to discriminate between the impulse of pity for men who work long hours on small wages, with the perfect right to find employment elsewhere and in another occupation, and the broad and far-reaching scope of view which alone is true statesmanship. If the schoolmaster—with his rod—is so badly needed in Albany, how much more are his services required among the people who choose, presumably, the best representative men, to shape practical wisdom into legislation.

THE Rapid Transit Commissioners of this city have had a lively time of late. Inventors galore have clamored for recognition, and the competing claims of superiority in the respective systems shown them, must have tried their patience and discrimination to a high degree of tension. We have reason to believe, however, that the gentlemen appointed by Mayor Edson to report if a necessity exists for more rapid transit facilities in this city, in what parts of New York these are needed, the kind of power, other than horse-power, to be used, and to form and open to subscription a company, are equal to the tasks laid upon them. So far they have shown at least the diligence which is an ingredient of success in their work, and we anticipate the conclusion of their labors with hopeful expectations.

Recent British Patents Relating to Tramways.

THE inner and outer rails of a tram rail are formed separate, and the uppermost surface of each rail is formed similarly to the lowermost surface; a longitudinal groove is formed in both sides of each rail to receive a base plate placed between the two rails, and serving as the bottom or sole between the pair of rails, the outside grooves, for the time being, serving to receive the cotters or keys for fixing the rails in position. The object of an improvement in tram cars is to cause the drawbar to act at the circumference of the wheel (and not at its centre as is usual) when starting the vehicle. To facilitate the starting of tramway cars, etc., only one lever is employed for stopping and starting the car, the brake when applied causing the power to be stored up in a spiral spring, which power is available for assisting in the starting of the car. An invention provides that the wheels for tramway vehicles are made without the usual flat tread, and are adapted to run in a central V or rounded groove of the rail, so that the bearing is wholly in the groove. The head of the rail is notched so as to present a roughened surface to prevent slipping of the horses. The rails are supported on chairs connected together by cross ties, and are secured by bolts passing down through the chair, and secured by a nut fitting in a slot. When required to brake a vehicle, air pumps driven from the axle are caused to compress air into suitable receivers, and when starting the vehicle

the compressed air is used as a motive power in the said cylinders.

The body of a vehicle for road traction is provided with rails which run on wheels on platforms or rests carried on endless chains, which, during traction, run over pulleys on opposite sides of the vehicle.

The Rasmussen Cable System.

THE patents of this system are owned by the United States Cable Railway Company, Chicago, to whom letters of inquiry should be addressed. Charles W. Rasmussen is the patentee.

Space admits of scarcely more than the mere mention of the advantages claimed for it; advantages, by the way, which an examination of the model makes plain.

The Rasmussen cable system has no grip connecting the cars with the moving cable. It dispenses with the costly iron and concrete tunnel employed in other systems, having in place of this costly excavation, a small slotted iron tube measuring six by eight inches, more or less. This can be built directly to the cross ties of the track, and be flush with the surface of the road-bed. The use of such a tube is made possible by the fact that no fixed pulleys are required to support the cable, nor is there any grip to travel in the tube, but the cable is sustained by a series of two-wheeled trucks traveling upon rollers formed integral with the tube; and the attachment of the car to the constantly moving trucks is effected by means of moving arms projecting from the car through the slot of the tube, and readily controllable by the operator from his position on the front platform of the ordinary passenger car, so that the car can be stopped and started at pleasure. These arrangements make it obvious why a tunnel is dispensed with in the new system. The small tube described as taking its place can be laid directly upon the cross ties of ordinary horse-car tracks without interfering with the road-bed further than the removal of the central paving blocks. Friction on the traction cable is *nil*, because the arms of the car are caught by the cable-supporting trucks and not by the cable itself, so that whether the car moves at a lower rate of speed than the cable, or be at a standstill, still the cable can travel without friction. This obviously could not be the case were it passing through the jaws of a grip. Moreover, there are no stationary pulleys in the tube to constantly wear the cable. The cars can be gradually or instantly moved or started as desired, because the same movement by the operator which releases the cable also applies the brakes to the running wheels; and any speed is practicable. In case of there being an obstruction on the track, the car can be lifted therefrom, as the arms by which the car is connected with the moving cable are removable from the slot of the tube at any point in the roadway. As there are no fixed pulleys within the cable tube, it can be kept constantly clean by means of brushes or scrapers attached to the traveling cable. We are advised that the cost of introducing the Rasmussen is about one-fifth of the money expended on those systems already in operation. Two of the chief reasons of this economy are the saving due to the absence of tunneling, and that the cars now in use as horse-cars are perfectly available, with inexpensive additions, to be run by the Rasmussen cable system.

All the apparatus on the car consists of two drums, one at each end, over which passes the flat endless chain, on which are the three arms passing to the slot of the tube, as above described. The endless chain is regulated by a friction band passing over one side of each drum. Brakes are double acting, one movement braking the wheels of the car and controlling the friction band on the drum.

Automatic Spring Motor.

THERE is now on exhibition at the offices of the New York Automatic Spring Motor Company, No. 39 Nassau street, this city, the model of an automatic spring motor which certainly suggests availability on street railways. The patents cover several applications of the principle of the combination of springs on which it is constructed, among them, to the street car, to the locomotive engine, to elevators in buildings, and to such small machinery as the coffee mills used in grocers' stores, etc.

It is claimed that the use of the automatic spring motor on street railways would prove very economical. Fifteen hundred dollars is all the outlay necessary to complete the car for the track, including all machinery. This, moreover, is operated by one man, and so easily that, if desired, the services of a conductor can be dispensed with, the person in charge of the machinery being able to discharge his duties as well as to give proper attention to his own.

A car is being constructed in Philadelphia which will contain eighty springs, eight sets of ten springs each. Each set will be inclosed in separate cylinders, and each will have its own gearing. The power of eighty springs is sufficient for a run of eight miles. The entire force will not be used at any time. That of one set of springs will be exhausted before that of another set will be used, and each set will carry the car one mile. No difficulty is anticipated with regard to grades, the calculation being that a grade of six hundred feet to the mile can be covered without trouble. The grade question is met in this way: progress will be made on the level with one set of springs. Reaching a grade, shall it become necessary, force will be augmented by working another lever, thus releasing the force of another set of springs, and so on, to the use of as many as will be found necessary. The new car will have a front swing truck, lessening friction and enabling it to take short turns. It is likewise anticipated that, by means of the front swing truck, the car will be easily removable from the track in case of obstruction, and will be run around it. To stop the car, there will be provided a treadle to act upon a double-action band brake, locking both axles and stopping the car within the space of six feet.

Some minor features of the invention are a governor which may be set to determine the maximum speed of the car, and which has an indicator that will show the amount of reserved force left in each set of springs. It will be seen that the breakage of one spring would reduce the power of an eighty-springed car, only one-eightieth part, with the corresponding proportion of loss of speed. At the end of the route the broken spring would be repairable at the cost of five dollars, in two hours.

TWENTY-SIX new railroad routes in New York are proposed.

History of Traction By Cable.

II.

THE writer will endeavor in this letter to give a history of the earliest inventions of cable traction; and as these patents were all taken out in the early part of the present century it will be readily seen that even then much attention was given to this method of transportation, and that all the basic principles of cableways were anticipated. The first in order was the invention of William Francis Swendon, of Oxford street, London, who on the eighteenth of December, 1824, procured a patent for a "new invented wheelway and its carriages for the conveyance of passengers, merchandise, and other things along roads, railways, and other ways, either on a level or an inclined plane." It does not appear that this invention was ever applied to the operation of a railway of any sort whatever, but it will be noted that it contained the first essential idea of the cable railway—namely, the tube. The inventor proposed also to adopt a similar arrangement to the foregoing, for the towing of barges by erecting his patent wheelways by the sides or banks of canals or rivers. This invention as has been stated, did not come into actual use, and is referred to merely on account of its novelty and the fact that it embraced a tube.

But a certain William James, of London, devised a railway actuated by an endless chain or cable, for which a patent was granted him February 28, 1824. His invention was adopted and applied in the practical operation of the Dundalk Railway, Glasgow, about four miles in length, which continued in operation for several years, until it was superseded by the inventions of Cartes and Stephenson and Bidder. This consisted essentially of a traveling cable, which by means of a flexible link overcame depression pulleys at grade or curve. See Glasgow *Mechanics Magazine*, pages 193-199.

The next invention of importance in the history of cable railways was that of Stephenson and Bidder, for which a patent was issued in 1839, and which was applied on the London & Blackwall Railroad, some six miles in length.

Prior to this date, however, October 31, 1839, a patent had been issued to Mr. Cartiss for a grip or ground rope apparatus for attaching a train to an endless moving cable, or detaching it therefrom, and Messrs. Stephenson and Bidder adopted this invention in the operation of the London & Blackwall Railroad. He specifies it as a machine for connecting or disconnecting a train with a ground rope whilst the rope is in motion. The above road was operated for a long time, and in the AMERICAN RAILROAD JOURNAL of last October was published an account of the experience of a gentleman who had traveled on the road.

Readers will by this time have very plainly perceived that the tube grip and the cable are by no means new, but are older than the system of street car travel or transportation.

The next improvement in the cable railway system was made by Robert William Brondling, of London, who was granted, on October 30, 1845, a patent for improvement in railways and railway carriages. His improvement consisted in a new method of gripping cables by means of compression bars or dies, and a device for driving an endless cable by means of stationary engines, the gripping device being carried and operated from the carriage. This is the first instance on record of the combination of cable in tube under track between rails and gripper for engaging cable operated from car.

Mr. Brondling describes his invention as follows: "My invention consists in constructing a machine by which the railroad trains are firmly attached to or easily liberated from the rope which draws them; in causing the trains to pass upon the surface without any obstruction to the usual traffic along the public highways; in conforming the machine and rope below the surface and in a new mode of communicating the tractive power to ropes used on railways." His invention was applied on the inclines in Suffolk County, England, and Bidder also adopted a portion of his improvements on the London & Blackwall Railroad. The invention was chiefly used on inclines so steep that locomotives could not be employed upon them.

Thus it will be seen that the whole system of cableways was fully anticipated up to 1845, put in operation and successfully used for years in different parts of England, the whole essential ideas fully developed and carried out.

In this exemplification the writer has not crossed to our own country at all, but has simply quoted from old works giving details of the operation of these old expired patents.

By taking the whole system as indicated in this article, a successful cable railway can be operated, and hence it follows that anyone can take advantage of the prior state of the art and operate cable ways. The patents obtained since are simply improvements upon the previous inventions, and their value consists in that fact and that only. No one can claim the exclusive right to a system for operating cable railways, and all should abandon such a claim, and rest upon the strength and force of the improvements made in the inventions.

In conclusion, it is proper to state that these articles are prepared under the direction of Mr. A. H. Lighthall, that the valuable collection of books from which this information is drawn, have all been procured by him, and that any merit that there may be in these articles is solely due to his vast knowledge and ability in regard to this particular subject on which they treat.

In the next issue will be given a portion of the history of American inventions and operations, showing that early American inventions anticipated the latter-day improvements. Cable railroads are destined to become the popular motor in the transportation of street railways. There is room for all, and it is far better for the owners of lines that an exclusive monopoly should not exist. This Lighthall Cable Traction Company, Washington, D. C., does not claim a monopoly. It believes in live and let live, and that a reasonable outlay for patents with an interest in stock and franchises is the most just and reasonable way to deal with those wishing to change existing horse car lines to the cable system.

(*To be continued.*)

THE rectified oil of tar, popularly called the spirit of tar, mixed with twice its bulk of fish oil, when well rubbed with a brush every night, on both crust and sole, is said to be an eminently good application for hardness and brittleness in horses' feet.

THE Rapid Transit Commissioners, New York, completed their scheme of railroad routes on February 9.

TRAMWAY NOTES.

EVILS OF HEATED CARS.—In a communication to the New York *Tribune*, E. L. Atmore, M.D., says: "The habits of New Yorkers, consequent upon living long distances from business, are to blame for much of the prevalent pulmonary troubles. Let's take an average case, say of a man living in Brooklyn. He leaves a warm—possibly too warm—fireside in the morning. He is close-buttoned to the chin. He walks a block to the street car, and the exercise warms him up. He jumps into the car and finds the atmosphere close. Feeling heated, he throws back his overcoat. Before he reaches the end of the line he begins to feel chilled and pulls it tightly about him. At the Bridge or ferry he shivers as he comes from the street car to the entrance. He may and probably does get warm again on the boat or Bridge car. But the same chilling process is repeated at the other end of the line, and he reaches his place of business half benumbed. This is all the result of sudden changes from the outside cold to the inside heat. He gets a cold and a hacking cough that hang on all winter. The mucous lining of the throat is affected, bronchial troubles come on, or pulmonary disease sets in. While the public is always crying for heated cars and ferry-boats, it would be better for public health if none of them were heated. Passengers would then be subjected to a steady temperature, and knowing what to expect, would act accordingly."

THE New York Rapid Transit Commissioners, in the multiplicity of their arrangements, have listened to an explanation of the flexible road bed invented by O. C. Woolson, formerly inspecting engineer of the New York Elevated Railroad. In this system the ties upon which the rails rest are made in two parts or strips, the bottom strip resting on the girder and the top strip bearing the rails and rail guards. Between the strips is a space an inch in height, except in the middle and at both ends, where the strips are bolted together. Under the weight of a car or a locomotive the rails and upper strip will sink down into the center space about one-eighth of an inch, and will rebound when the pressure is removed. The claim in regard to this invention is that at all times the cars will have a road bed safe, steady, and free from inequalities, and that the ties will wear longer than if solid. Mr. Woolson advised the building of a platform two feet below the regular platform now in use at the elevated railroad stations, the idea being that such a platform would catch all persons dragged by trains beyond the railings of the station.

THE Germantown *Telegraph* says: "As long as we can remember, this singular fit of obstinacy in the horse has been discussed, and all sorts of plans given for overcoming it. It must be remembered that what will prove a remedy for one horse will not for another. The original cause of it is, doubtless, neglect and ill treatment of the colt, or after it has been broken to harness. Sometimes stopping a few moments will be sufficient to start the animal again of its own accord. Kind words, patting, a handful of hay or grass, an apple, or a little black pepper put upon the tongue, will induce it to go ahead as if nothing had been the matter. Whipping, at all times, and especially in this case, is the worst resort. We have ourselves induced balky horses to quietly start by some of these means, and one was entirely cured of it by letting it stand until it went on again of its own will. Sometimes the mere turning of the head and letting the animal look in a different direction, or rubbing the nose, has answered; so has tying a string around the foreleg below the knee and drawing it rather tight. Various resorts of this kind should be adopted, but never force."

THE Haddock cable system, now in use in Cincinnati, has been examined by Lewis Lyon, president of the Third Avenue and 125th street railways, New York; Edward Lauterbach, attorney, and William H. Payne, engineer of the Brooklyn Bridge, who are reported to have expressed themselves highly satisfied with it. This system is claimed to be the only system operated by a single cable that will turn at will to the right or to the left or cross at right angles another cable with grip and cars. A patent secures to the company the right to lay telephone or telegraph wires in the cast-iron tunnel in which the cable runs. The cost for building in this system will not exceed $40,000 per mile, it is claimed. The company has proposed to introduce, at its own expense, a new system for working the cars on the Brooklyn Bridge, but the trustees have thus far taken no action.

WORKING models, plans, and specifications of construction of the Riley Elevated Railroad have been shown the New York Rapid Transit Commissioners by Frank A. Bartholomew, president of the company. In this system the cars run on a single rail, and are kept in position by safety wheels and guards on each side of the superstructure, two feet below the bearing rail. It is claimed that under no circumstances can the cars be derailed. The cost per mile for construction is estimated at $75,000. During the coming summer a two-mile section of this road will be in operation at Rockaway Beach.

S. M. ANDREWS, proprietor of the Fifth Avenue (New York) stages, says: "There has been no money in stages this winter. We have had to pay men to shovel snow, and also had to double up our teams so that it took all our stock to keep half our stages running. There has been bad weather ever since Christmas; part of the time the avenue was so full of holes in the snow that a stage-ride would make one sea-sick. Stages have broken down and horses been sprained and otherwise injured. But we carry a good many people in spite of the elevated roads and street cars."

AN English exchange informs us that a company has been formed to construct and work a cable tramway between places ten and a half miles distant. The machinery is driven by water, the power being derived from a river, at a point half-way between the two termini, where the stream is twenty-eight inches deep by thirty-five feet wide, with a speed of sixty-five feet per minute. The track is to be of three feet gauge, and the pulleys carrying the cable are to be above it. The journey is to be made in one hour.

THE Second Avenue cars, this city, are warmed by a small furnace or heater attached to the under side of the floor upon one side, and midway between the wheels. The fire is fed and regulated from the outside. A pipe conducts the smoke to a corner of the car, where it is carried to the roof by a vertical pipe. The heated air is let into the car through perforated tin registers immediately over the furnace.

Two Baltimoreans, George A. Dubreuil and Richard Gornall, have had on exhibition in this city, models showing a system of traction by means of a steel band instead of cable. This can be worked from either below or above the car. The Rapid Transit Commissioners spent a long time inspecting the system, of which a detailed account will be given in a future issue.

In the Allen Bicycle system for an elevated railroad, as explained to the New York Rapid Transit Commissioners, the cars run on a single rail, supported on light posts. It is claimed that a train attached to a locomotive using a driving-wheel fifteen feet in diameter can be driven at the rate of 120 miles an hour.

The total length of street railways in operation in Amsterdam, Holland, on January 1, 1883, including sidings and double-tracks, was about 29,945 meters, or about 18¾ miles. Total length of streets through which tracks are laid is 20,670 meters, or nearly thirteen miles.

One of the horse-car companies in Brooklyn has provided each of its conductors with an apparatus which records the fare, and gives the passenger the opportunity of noting the time, a watch with a conspicuous dial, forming part of it.

To induce an increase of passenger traffic, one of the street-car companies of Cleveland, Ohio, displays placards promising that no cents shall be given in change. They are received for fares but not given out.

Theron R. Butler, president of the Sixth Avenue Railroad Company, New York, is dead. He became president of the Sixth Avenue Railroad Company in 1865, and was also a director of the Erie Railroad Company.

Dr. Thomas S. Lambert claims that his grooved track pavement would solve the problem of both slow and rapid transit on Broadway, New York.

In his recent visit to San Francisco, General Hancock was greatly interested in the workings of the cable railway system.

List of Recent Patents for Inventions Relating to Tramways.

BEARING DATE JANUARY 1, 1884.

291,055. SHOE FOR HOOF-BOUND HORSES: William H. Hendricks, Whitehall, Ind. Filed Nov. 3, 1883.

291,138. AUTOMATIC STREET-RAILWAY SWITCH: Earl Bill, Cleveland, Ohio. Filed June 9, 1883.

291,144. CABLE-MOTOR: Charles R. Brown, Imperial, assignor of one-half to William McCreery, Pittsburgh, Pa. Filed Sept. 7, 1883.

291,229. BLINDER FOR HORSES: Bernard Rice, Brooklyn, N. Y. Filed May 17, 1883.

291,325. HAME: Fred Frazer, Syracuse, N. Y. Filed Nov. 14, 1883.

291,341. SAND-BOX FOR STREET-CARS: George H. Hathaway, Fairhaven, Mass. Filed Nov. 16, 1883.

291,357. HITCHING DEVICE: James L. Kennedy, Sioux City, Iowa. Filed Sept. 29, 1883.

291,365. HALTER: John C. Lighthouse, Rochester, N. Y. Filed June 18, 1883.

291,390. HAME-FASTENER: Marsh Noe, Davenport, Iowa. Filed Sept. 1, 1883.

BEARING DATE JANUARY 8, 1884.

291,589. TRACTION-ROPE RAILWAY: Eleazer S. Gardner, Philadelphia, Pa., assignor of two-thirds to John H. Gould, same place, and Oliver L. Gardner, New York, N. Y. Filed June 8, 1883.

291,594. CAR-STARTER AND BRAKE: George M. Hathaway, New York, N. Y., assignor of one-half to Charles C. Keeler, same place. Filed June 7, 1883.

291,596. BRIDLE: Marcellus M. Hitt, Luray, Va. Filed Feb. 24, 1883.

BEARING DATE JANUARY 15, 1884.

291,896. TRACE-FASTENER: Nickolas Martin Habberstad, St. Paul, Minn. Filed May 7, 1883.

291,898. CABLE-RAILWAY PROPULSION: William Wallace Hanscom, San Francisco, Cal. Filed Sept. 19, 1883. Patented in England Aug. 16, 1882, No. 3,927, and Nov. 29, 1882, No. 5,690.

BEARING DATE JANUARY 22, 1884.

292,165. CABLE-RAILWAY PROPULSION: William Wallace Hanscom, San Francisco, Cal. Filed Oct. 3, 1883.

292,302. HORSESHOE: Albert E. Hall, Quincy, Minn. Filed June 28, 1883.

292,360. HARNESS-SADDLE: Alonzo C. Rickey, Boone, Iowa, and Edwin D. Myers, Wooster, Ohio. Filed April 30, 1883.

292,379. CAR-AXLE BOX: John Stephenson, New York, N. Y. Filed April 21, 1883.

BEARING DATE JANUARY 29, 1884.

292,483. PROPULSION OF STREET-CARS AND OTHER VEHICLES: Neil F. Graham, Falls Church, and Howard H. Young, Carlins Springs, Va. Filed May 29, 1883.

292,624. PILOT OR GUARD FOR CARS OF CABLE-ROADS: Wm. U. Bohm, San Francisco, Cal. Filed May 4, 1883.

292,655. RAILROAD T-RAIL: Tom L. Johnson, Indianapolis, Ind. Filed Feb. 20, 1883.

292,759. ROLL FOR ROLLING CAR-RAILS: Arthur J. Moxham and John R. Tranter, Louisville, Ky. Filed Oct. 23, 1883.

Sand Box Attachment for Street Cars.

George H. Hathaway, Box 242, Fairhaven, Massachusetts, has been granted letters patent on his sand box attachment for street cars. It has been used on the cars of the New Bedford and Fairhaven Street Railway Company and elsewhere, and has given entire satisfaction.

The attachment is operated inside the dasher at either or both ends of the car, where is placed a spring which, on being pressed by the driver's knee, causes the valve to open, and the sand, which is placed in a box under the car seat, passes through a short pipe directly in front of the wheel. The flow of sand is regulated by the force used in pressing the spring, or by a ratchet outside the dasher that may be adjusted so as to deliver a constant stream of sand at any gauge. By a device on the end of the distributing pipe, the clogging of the pipe by mud is avoided. It is claimed that the attachment works equally well on either grades or level roads, and that it will be found a safeguard against accidents, and will effect a great saving in wear of brakes.

The San Francisco *Bulletin* prints a description of the proposed cable road up Telegraph hill, in that city, from which it appears that the road will be about 1,700 feet in length. Two separate cables will run in two trenches, similar to those in common use. To one end of each cable a car will be permanently attached by an arm extending down from the car, through a slot to the trench. The power required will be supplied by engines at the upper terminus, having link motion, so that one car can be allowed to unreel its cable and run down its own track by power of gravitation while the other car will be hauled up on the other track. Each cable will be supplied with an electric conductor connecting the car with the engine-room. The cars will be twenty-two feet long, half open and half closed, and mounted on four wheels instead of four-wheeled trucks; and the cable of the usual type.

New Inventions.

IMPORTANT TO INVENTORS.

THIS department of the AMERICAN RAILROAD JOURNAL is devoted to descriptions of the many and interesting New Inventions applicable to railroads, and in order to make it as complete as possible, inventors whose improvements properly come under this description, are invited to send us a detailed account of the same. This should consist of facts only, presented in clear and concise language, written only on one side of the paper, and the sheets numbered consecutively. In all cases in which it is desirable and practicable, the written description should be accompanied by a cut or cuts illustrating the invention. This or these should be marked distinctly on the bottom, with the name and address of the sender. All cuts received are preserved at this office, or returned, if desired, to the person sending them to us for use. As we have an engraving department we are prepared to make cuts, and furnish estimates of our charges for the same to those persons who write us for such particulars. That we may estimate exactly and without delay, it is necessary that we have sent to us, a photograph of the Model and a copy of the Specifications.

The reader of course understands that the editors reserve their inalienable rights to decide what "copy" they shall use, what changes shall be made in it, if any, and when they shall use it; but they guarantee the impartial consideration of every description sent them.

Descriptive articles relating to Tramways will be placed in that department.

List of Patents for Inventions Relating to Railways, Machinery, Etc.

BEARING DATE JANUARY 1, 1884.

291,049. APPARATUS FOR LAYING RAILROAD-TRACKS: Chas. R. Goodman, Hammond, Ind. Filed May 9, 1883.

291,073. STATION-INDICATOR: Chas. W. Musgrove, Lock Haven, Pa. Filed Sept. 6, 1883.

291,095. RAILWAY-TRAIN SIGNAL APPARATUS: Chas. Selden, St. Louis, Mo. Filed April 2, 1883.

291,109. CAR-BRAKE: Marshall Turly and Reuben T. Bryant, Council Bluffs, Iowa. Filed Oct. 12, 1883.

291,110. MACHINE FOR ROLLING COUPLING-PINS: Robert Richardson Turner, West Middlesex, Pa. Filed March 10, 1883.

291,113. DUMPING-CAR: Matthew Van Wormer, Melrose, Mass. Filed Sept. 8, 1883.

291,120. LOCOMOTIVE-BOILER: John E. Wootten, Philadelphia, Pa. Filed Aug. 23, 1883.

291,136. STOCK-CAR: Anthony Berdanier and Adam F. Berdanier, Philadelphia, Pa. Filed Aug. 16, 1883.

291,149. CAR-COUPLING: Daniel Carlough, Paterson, N. J. Filed Nov. 26, 1883.

291,180. APPARATUS FOR OPERATING RAILWAY-TRAINS: Bernard Frese, Chicago, Ill. Filed March 31, 1882.

291,182. SNOW-PLOW: David B. Garton, Barrie, Ontario, Canada, assignor of one-half to Edmund C. Edmonds, Albany, N. Y. Filed Aug. 24, 1883.

291,210. CAR-COUPLING: Pierre Mayrand, Montreal, Quebec, Canada. Filed Oct. 27, 1883.

291,232. RAILROAD-JOINT AND FASTENING DEVICE: Sumner Shaw, Boston, Mass. Filed Feb. 3, 1883.

291,247. OILER FOR CAR-AXLE BOXES: Geo. K. Waterhouse, Boston, Mass., assignor to himself and James Morse, same place. Filed June 11, 1883.

291,263. CAR-SEAT: William A. Ackley, Hackettstown, N. J. Filed July 7, 1883.

291,289. CAR-COUPLING: John C. Bryan, Holly Springs, Ark. Filed Oct. 17, 1883.

291,290. CAR-COUPLING: George W. Butler, Knoxville, Tenn. Filed Oct. 31, 1883.

291,360. RAILWAY BLOCK SIGNAL: John K. Knight, New York, N. Y., assignor to William H. Baker. Filed July 24, 1882.

291,363. SAFETY-DOOR FOR RAILROAD-CAR PLATFORMS: Frank Lappin, Baltimore, Md., assignor of one-half to Virgil Walker, Philadelphia, Pa. Filed Nov. 7, 1883.

291,382. CAR-TRUCK: William H. Montz, Lehighton, Pa. Filed Sept. 10, 1883.

291,385. CAR-COUPLING: David E. Morgan, Detroit, Mich., assignor of one-half to Adam G. Monroe, same place. Filed Oct. 22, 1883.

291,404. CAR-DOOR FASTENING: Salisbury F. Rosse, Sedalia, Mo. Filed Aug. 6, 1883.

291,411. CAR-DOOR: Wm. W. Shallus, Lancaster, Pa., assignor of one-half to Henry H. Keen, same place. Filed Oct. 10, 1883.

291,446. CAR-COUPLING: Ransom S. Wheeler and James Wheeler, Red Oak, Mo. Filed June 23, 1883.

BEARING DATE JANUARY 8, 1884.

291,495. DEVICE FOR STOPPING RAILWAY-TRAINS: John Wills Cloud, Altoona, Pa. Filed June 23, 1883.

291,498. CAR-COUPLING: Charles Devlin, Pembroke, Ontario, Canada. Filed Oct. 1, 1883.

291,514. RAILROAD-TIE: Henry R. Holbrook, Pueblo, Colo. Filed May 2, 1883.

291,523. RAILWAY-TRACK: John George Krichbaum, Youngstown, Ohio, assignor of one-half to John C. Kloffenstein, same place. Filed Feb. 17, 1883.

291,545. RAILWAY-SIGNAL: Abraham B. Snyder, Louisville, Ohio. Filed Aug. 27, 1883.

291,547. BEARING FOR CAR-AXLE JOURNALS: Geo. W. Stewart, Atlanta, Ga., assignor, by direct and mesne assignments, to Edmund Holland, same place, Gustavus G. Lansing, New York, N. Y., Theophilus P. Brown, Toledo, Ohio, and Geo. W. Smith, Lafayette, Ind. Filed May 29, 1883.

291,556. ELECTRIC RAILWAY-SIGNAL: William Vogel, Chicago, Ill., assignor of one-half to William T. Underwood and Bernhard Schram, same place. Filed May 15, 1883.

291,572. CAR-COUPLING: John C. Bryan. Holly Springs, Ark. Filed May 4, 1883.

291,590. MAGNETO-ELECTRIC RAILWAY-SIGNAL: Wesley Ward Gary, Boston, Mass. Filed Aug. 18, 1881.

291,613. TRACK AND ROAD-BED FOR RAILWAYS: Harvey C. Lowrie, Denver, Colo. Filed Oct. 2, 1882.

291,618. CAR-WHEEL: Geo. W. Miltimore, Chicago, Ill. Filed Aug. 10, 1883.

291,622. RAILWAY PASSENGER-CAR: William H. Paige, Cleveland, Ohio. Filed Aug. 20, 1883.

291,624. RAILWAY-SWITCH: Byron Rice, West Schuyler, N. Y. Filed Aug. 29, 1883.

291,675. SNOW-PLOW: Pierre Brunet, Toronto, Ontario, Canada. Filed June 14, 1883. Patented in Canada Aug. 20, 1883, No. 17,529.

291,713. DRAFT-REGULATOR: Wm. F. Grassler, Williamsport, Pa. Filed Aug. 4, 1883.

291,721. RAILWAY-SIGNAL SYSTEM: William Hadden, Brooklyn, N. Y. Filed Feb. 19, 1883.

291,749. FILLING FOR RAILROAD-FROGS: George C. Lucas and John A. Patterson, Cleveland, Ohio. Filed May 3, 1883.

291,764. RAILWAY PASSENGER-CAR: Edwin P. Osgood, Malden, Mass. Filed Nov. 12, 1883.

291,801. CAR-DUMPER: Thomas S. Stewart, Saltsburg, Pa. Filed Nov. 26, 1883.

291,804. RAILROAD SWITCH-STAND: Charles H. Talmage, Atchison, Kans. Filed March 16, 1883.

291,807. CAR-WHEEL: Harrison G. Taylor, Toronto, Ontario, Canada. Filed July 18, 1883. Patented in Canada Aug. 15, 1883. No. 17,495.

291,826. FLUID-PRESSURE CAR-BRAKE: Robert J. Wilson, Pittsburgh, Pa. Filed Oct. 13, 1883.

291,841. CAR-BRAKE: Simon Fairman, Baltimore, Md., assignor of one-half to John G. Mitchell and William S. Taylor, both of same place. Filed Sept. 21, 1883.

291,847. LUBRICATOR FOR LOCOMOTIVES: Clarence B. Hodges and Charles H. Hodges, Detroit, Mich., assignors of one-half to Henry C. Hodges and Charles C. Hodges, both of same place. Filed Nov. 7, 1883.

BEARING DATE JANUARY 15, 1884.

291,868. DETECTING-BAR FOR RAILWAY-SWITCHES: James A. Bonnell, New York, N. Y., assignor to the National Interlocking Switch and Signal Company, same place. Filed Feb. 9, 1883.

291,908. RAILROAD-SWITCH: Robert H. Isbell, New York, N. Y. Filed Feb. 14, 1883.

291,911. CAR-COUPLING: William H. Jones, Martinsburg, Iowa. Filed Oct. 12, 1882.

291,913. NUT-LOCK: Samuel P. Kimball, Woodstock, Ohio. Filed Dec. 7, 1883.

291,914. METHOD OF AND APPARATUS FOR PRESERVING AND TRANSPORTING FOOD: Samuel Henry Linn, New York, N. Y. Filed Sept. 18, 1883.

291,929. RAILROAD-SIGNAL: James R. Park, La Vergne, Tenn. Filed July 6, 1883.

291,960. CAR-COUPLING: Milton R. Thurber, Scranton, Pa., assignor of two-thirds to Alfred Harvey and Horatio Patrick, both of same place. Filed July 6, 1883.

291,988. RAILROAD-SWITCH: John H. Crowley and Bernard M. Temple, Galveston, Texas. Filed July 13, 1883.

292,029. RAILWAY TORPEDO-PLACER: Gilson Warner Metcalf, Baltimore, Md. Filed Sept. 27, 1883.
292,074. CAR-COUPLING: Chas. Uebinger, St. James, Ind. Filed Oct. 20, 1883.
292,126. CAR-COUPLING: Thomas Jefferson Miller, North Manchester, Ind., assignor of one-half to Marcus L. Harter same place. Filed Nov. 3, 1883.
292,144. RAILWAY-SWITCH: Edward Stone, Cortland, N. Y., assignor of one-half to John Hodgson, same place. Filed July 18, 1883.
292,146. SUPERHEATING ATTACHMENT FOR STEAM-BOILERS: James Andrew Stout, Belleville, Ill., assignor to the Harrison Machine Works, same place. Filed Nov. 26, 1883.

BEARING DATE JANUARY 22, 1884.

292,192. RAILWAY-CAR: Richard H. Wyman, Evanston, Ill. Filed Nov. 23, 1883.
292,223. RAIL-JOINT: Charles F. Hartman, Keller's Church, Pa. Filed April 26, 1883.
292,246. AUTOMATIC CAR-BRAKE: John D. Miller, Big Sandy, assignor of one-third to Thos. M. Miers, Dallas, Texas. Filed June 11, 1883.
292,248. CAR-SPRING: Harvey J. Mitchell, Philadelphia, Pa. Filed Sept. 21, 1883.
292,267. CAR-WHEEL: Theodore Thomas, New York, N. Y. Filed June 15, 1883.
292,268. CAR-COUPLING: Walter Turnbull, New Orleans, La. Filed Nov. 17, 1883.
292,278. CAR-COUPLING: Charles W. Bond, Toledo, Ohio. Filed Sept. 13, 1883.
292,301. NUT-LOCK: John W. Haley, North Hartland, Vt. Filed Dec. 3, 1883.
292,336. COAL-CAR: John D. Madeira, Chillicothe, Ohio. Filed Dec. 10, 1883.
292,339. CAR-COUPLING: Cassius McArthur, South Shenango, Pa. Filed Nov. 3, 1883.
292,399. CAR-AXLE BOX: William S. G. Baker, Baltimore, Md. Filed Sept. 21, 1883.
292,421. RAILWAY-TIE: Jas. J. Du Bois, Springtown, N. Y. Filed Aug. 28, 1883.
292,429. CAR-BRAKE: George M. Hathaway, New York, N. Y., assignor of one-half to Charles C. Keeler, same place. Filed Aug. 9, 1883.
292,430. CAR-COUPLING: Marshall Hayden, New Milford, Pa. Filed Dec. 4, 1883.
292,452. BRASS FOR CAR-AXLE BEARINGS: John Wallace, Albany, N. Y., assignor of one-half to Geo. T. Weaver, same place. Filed Mar. 6, 1883.
292,454. CAR-TRUCK: Andrew Westlake, Leadville, Colo. Filed July 3, 1882.

BEARING DATE JANUARY 29, 1884.

292,472. WATER-CLOSET FUNNEL OF RAILWAY-CARS: Isaac H. Congdon, Omaha, Nebr. Filed July 20, 1883.
292,499. CAR-SEAL: Thomas H. Malone, Milwaukee, and George A. Whiting, Neenah, Wis. Filed July 16, 1883.
292,504. ATTACHMENT FOR LOCOMOTIVES: La Fayette Willson Page, Shreveport, La. Filed March 26, 1883.
292,506. CAR-COUPLING ADJUSTER: John P. Pies, near New Washington, Ohio. Filed Nov. 21, 1883.
292,507. NUT-LOCK: John F. Plummer and Henry P. Chapman, Essex, Conn. Filed Dec. 12, 1883.
292,538. CAR-COUPLING: John Coup and David McCurdy, Cleveland, Ohio, and William B. Rice, New York, N. Y. Filed Oct. 1, 1883.
292,553. COMPENSATING DEVICE FOR SIGNALS: David S. Gardinier, Hudson, N. Y. Filed Sept. 26, 1883.
292,557. CAR-COUPLING: Francis A. Hoyt, West Cleveland, Ohio, assignor of two-thirds to L. H. Ware and J. W. Moore, both of same place. Filed June 12, 1883.
292,564. CAR-COUPLING: Charles G. McCormick, Cincinnati, Ohio, assignor of one-half to George L. McCormick and John N. McCormick, both of same place. Filed Jan. 27, 1883.
292,595. SLEEPING-CAR: John Shorey, Lowell, assignor of two-thirds to Phineas E. Merrihew, Fairhaven, Mass. Filed May 17, 1883.
292,641. AUTOMATIC RAILWAY-GATE: George F. Forbes, Hyde Park, Mass. Filed April 16, 1883.
292,675. CAR-ROOFING: William H. Paige, Cleveland, Ohio. Filed Oct. 1, 1883.
292,687. RAILWAY-SWITCH CIRCUIT-CLOSER: Chas. A. Scott, Boston, Mass. Filed April 16, 1883.
292,698. CAR-COUPLING: Milton M. Shur, Washington, D. C. Filed Dec. 5, 1883.
292,702. RAILWAY-JACK: Morton B. Somes, Fennville, Mich. Filed Dec. 1, 1883.
292,704. CAR-COUPLING: William Stamp, Susquehanna Depot, Pa. Filed Sept. 15, 1883.
292,712. BELL-RINGING ATTACHMENT FOR LOCOMOTIVES: Pennock M. Way, Thurlow, Pa. Filed June 12, 1883.
292,724. CAR-COUPLING: Parker Wineman, Chicago, Ill. Filed Nov. 19, 1880.
292,736. AUTOMATIC CAR-BRAKE: Joseph C. Dane, La Crosse, Wis., assignor of two-thirds to Lucinda S. Card and Forrest J. Smith, both of same place. Filed April 13, 1883.
292,743. INTERLOCKING-SWITCH APPARATUS: Oscar Gassett, Boston, Mass., assignor to the Union Switch and Signal Company, Pittsburgh, Pa. Filed Dec. 4, 1882.
292,744. ELECTRIC SIGNALING APPARATUS FOR RAILWAY-CROSSINGS: Oscar Gassett, Boston, Mass., assignor to the Union Switch and Signal Company, Pittsburgh, Pa. Filed March 26, 1883.
292,760. SPARK-ARRESTER: Peter Murray, Indianapolis, Ind., assignor of one-half to Patrick Murray, Alma Mine, Evanston, Wyo. Filed Aug. 13, 1883.
292,773. CAR-SPRING: Richd. Vose, New York, N. Y. Filed May 24, 1883.

Improved Window for the Cab of Locomotives.

THIS new contrivance is the device of John Shields, of Hancock, Houghton County, Michigan. It has for its object to provide a window which may be opened, so as enable the engineer to have a free lookout along the track, and at the same time protect him against the weather and smoke and cinders from the engine, while it may be slid forward, if desired, in the manner usual in this class of windows, leaving the window entirely free and open. The means to this end may be briefly indicated as follows:

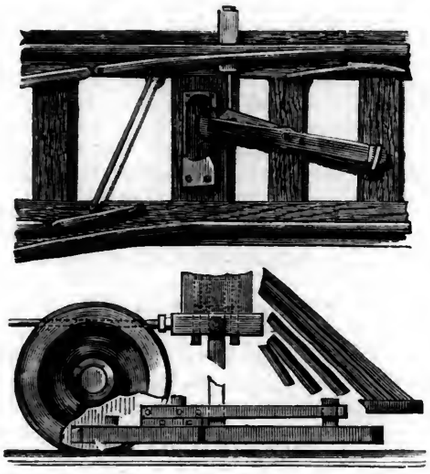
The cab frame is provided with a fixed window and a sliding frame in which is hinged a window. To prevent interference with the sliding of the window and its frame, the hinges are sunk into the frame. A bar bent in the end, is hinged to the swinging window. The bent end of this bar is adjusted to engage in a series of staples or bails upon the inside of the bottom piece of the sliding frame in which the swinging window is hung. This provides for the opening of said window at any angle desired. Upon the inside of the bottom piece of the frame is a staple adapted to receive the bent end of the bar above mentioned, and to hold the sliding frame either closed or slid back in front of the fixed window, while a turn-button or swivel serves to hold the swinging window closed. In this manner it will be seen that the swinging window may be opened at any desired angle, protecting the engineer in looking out, while, when desired to have a perfectly free lookout, or when the engine is passing objects near to the track, which might come in contact with the window, it may be closed and slid forward in its ways in the same manner as windows usually employed in locomotive cabs. A sector-shaped plate may be hinged to the upper edge of the swinging window in such a manner that it may be extended to cover the opening on top between the swinging window and the sliding sash, forming a protection from objects from above, and be folded down when it is desired to slide the window forward.

A NEW kind of vertical steam boiler has been invented by Mr. Armer. The object of the design is to obtain the greatest possible efficiency in the steam-heating surfaces. In order to effect this, the tubes have a helical twist given them, which does not interfere with the ease with which they may be cleansed, but which causes greater impingement of the gases against the tube walls, and gives more freedom for expansion than straight tubes.

The Fay Automatic Safety-Switch.

AMONG the important railway inventions may be mentioned the Automatic Safety-Switch, recently patented by Albert T. Fay, 715, 4th street, S. E., Minneapolis, Minn.

This invention consists of a switch-lever contrivance and apparatus to be attached to a locomotive to enable



the switch to be shifted by the locomotive or not, at the will of the engineer, the shifting apparatus being contrived to be set by steam for shifting the switch to right or left, the switch being self-locking, and arranged so that when open, the switch-rails can be shifted by the wheels so as to pass it in one direction, after which the rails will be shifted back by a spring arrangement in the switch-bar, so contrived for enabling the train coming upon the main line and wanting to back off over the switch, to change the switch before passing it, so that after passing the said switch it will be set for backing off on the branch. The switch-rail is connected to the switch-bar by springs in such a manner as to allow the rail to be shifted along the bar so that when the switch is set for the siding, as represented in the cut, a train moving to the right hand will shift the switch-rail by the flanges of the wheels, so as to pass the switch safely, and after the train has passed, the spring will set the switch again, so that the train may back on to the branch. In order to control the switch from the train when the latter is moving in the opposite direction—that is from right to left—a lever is arranged upon the ties between the rails, to be shifted by a shifter attached to the locomotive acting on the stud of the lever, said lever being arranged on a fulcrum point, and connected with the switch-bar by a pin. The end of the switch-lever projects into the lock-case, to be locked after shifting the switch, by the spring catches. A trip-lever, which is pivoted to the switch-lever, is arranged to trip the catches when the switch-lever is to be shifted; said lever having a vertical arm working in a slot in the stud, and being a little wider than said stud, it always projects a little beyond the side of the stud on which the shifter is to act, and is thereby moved far enough before the shifter acts on the stud to enable the bevel corners to unlatch the catches and free the switch-lever at the moment when the shifter strikes it. The springs forming the connection of the switch-rail with the switch-bar or cushion, the shocks when the train, running rapidly, shifts the switch by the lever to pass along either the main line or the branch.

The shifter consists of a point-headed bar suspended by a shaft from a steam-chest which is bolted to the under side of the cross-beam of the pilot.

The upper end of the shaft has an oscillating piston working in the triangular steam-space, the steam being admitted to and exhausted from opposite sides of the piston through ports, according as the live steam or the exhaust passages of the valve register with said ports. Live steam is taken direct from the boiler by means of suitable connections.

It will be noticed that when the valve stands in the central position, both sides of the piston are open to exhaust. A movement of the valve to the right will close the exhaust and open the steam cavity to the port on that side, admitting steam to shift the piston to the left. The reverse motion of the valve will effect a reverse motion of the piston, and the piston thus swings the shifter to the right or left at the will of the engineer, who works the valve as required by a lever located in the cab of the engine.

The range of the shifter is limited by a stud-pin in the upper side of the front end of the shifter, which engages stops attached to any part of the engine suitable for arresting the lever and supporting it when it strikes the stud. To return the shifter to the middle position and retain it there, so that it will pass the switch-lever without shifting it, a couple of springs are made to bear against said stud, said springs being attached to supports mounted on a guard that is suspended from the locomotive. This guard is for the purpose of preventing the switch-lever from rebounding after being shifted, by its edges holding the lever in the position to which it is shifted for a short time thereafter, while said guard is passing the stud of the switch-lever, to allow the catches time to engage it.

It will be seen that the engineer has by this contrivance complete command of the switch, whichever way his train may be moving, and whichever way the switch may be, whether open or closed. The switch can be shifted by hand if required.

Further information can be obtained by addressing the inventor as above.

Electric Motor.

IN electric motors, a continuous current of electricity, when it is generated, is utilized as a motive power. That one of which a general description is appended, was invented with the object to produce a machine that will utilize all or the greatest amount of electro-magnetic force produced by the circulation of a continuous current of electricity through an electric conductor and its accessories, for the production of motive power; and also for the propulsion of other machinery not of a locomotive character. The inventor and patentee is William L. Silvey, of Castleton, Indiana, whose pen is familiar to readers of this journal. In his specification, Mr. Silvey enters into a minute description of the underlying electric principle which all electro-motors should embrace. Said specification, which is too long for insertion in these columns, forms part of letters patent No. 269,888, dated January 2, 1883. It contains reading useful to all who interest themselves in the subject of applying electricity in industrial processes.

To attain his present object, Mr. Silvey has devised an

electric motor which, he claims, is capable of utilizing the following forces: first, the attraction and repulsion of electro-magnets; second, the attraction and repulsion of a coil of wire through which a current is flowing toward a magnet; and, third, the attraction and repulsion of two or more coils through which currents are circulating.

A Railway Bridge Indicator.

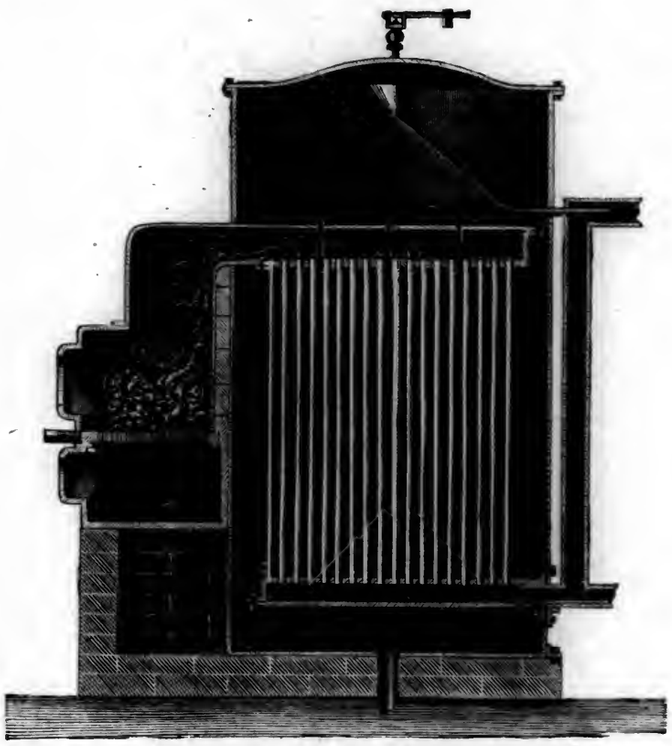
ELAM A. GROSS, Camden, New Jersey, has invented and patented a device for indicating the approach to bridges or tunnels on railway tracks. It consists of a series of wires suspended transversely across and above the track and suitably fastened ahead of the bridge or tunnel, provided with bells or other suitable sonorous alarms at their lower ends, and with depending wires adapted to operate said bells or alarms when struck by a person or persons standing on the roof of the cars. The picture of this novel device shows a post or upright, with an arm extending transversely, and at a suitable distance above the track. This arm is provided with staples or similar fastenings, from which depend a series of wires. Below these are bells, one on each wire; and below the bells depend wires, one from each bell. The theory is, that when these lower wires are brought in contact with a person or persons standing on the roof of a car, the bells to which they are attached will ring.

Steam Generator.

THE United States patent, No. 289,989, issued December 11, 1883, to Joseph E. Culver, M. D., Jersey City, inventor, embodies several novelties of interest, and provides for the practical application of thermodynamic laws long familiar to the scientific world, but hitherto ignored in the construction of steam generators.

The furnace shown in the accompanying drawings is like an ordinary furnace, inasmuch as it has a grate with a fire-pot and combustion chamber above, and an ash-pit beneath, a door above the grate for feeding the fuel, and a door below the grate for removing ashes and for admitting air, etc. But besides these, there is shown appended a secondary combustion chamber, separated from the primary combustion chamber by a partition. A narrow flue, opening through the top of this partition, connects the two chambers. An upper air inlet extends from the furnace front along the apex of the primary combustion chamber, and discharges heated air to mingle with the flames just at the mouth of the entrance to the secondary combustion chamber. Within the primary combustion chamber, hydro-carbonaceous gases distil forth from the blazing fuel, ignite, and are in part consumed. The secondary combustion chamber is not a retort to receive fuel and generate additional supplies of inflammable gases; but, rather a reverberatory into which pours a stream of burning flame and hot air, therein to tarry a little and complete the combustion. To secure the best results, the two combustion chambers must be capacious; especially their vertical measurements should be large, relatively, to the area of the grate surface.

The secondary combustion chamber also operates as the upper flue chamber of a thermostatic flue system. It is connected with a lower flue chamber by a series of boiler tubes so arranged that the tubes shall all communicate with each other through the medium of the chambers they connect, the fuel gases escaping from the lower chamber through a suitable discharge pipe. The fuel gases, while traversing such a flue system, are thermostatically balanced; and successive strata of flames and gases, hottest at top and coolest at bottom, follow each other downward through every flue in unchangeable order, the coldest foremost. A thermostatic flue system may be constructed of tubes only, or of chambers suitably con-



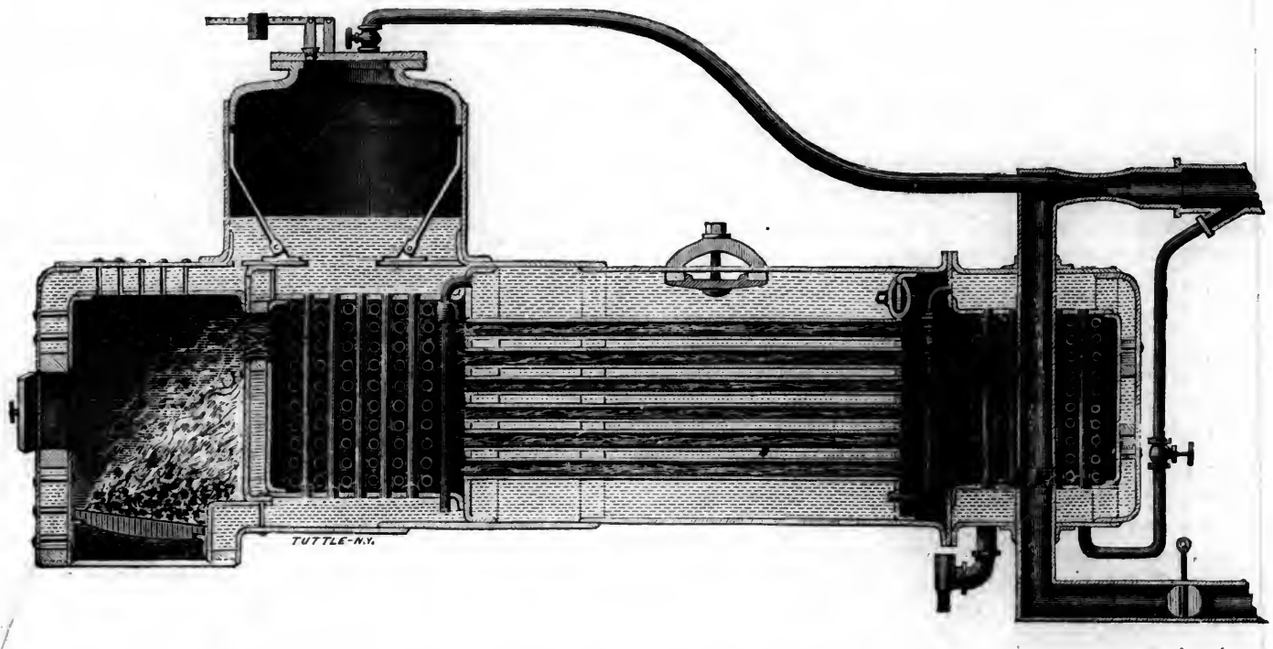
nected, or of any suitable combination of chambers and tubes, arranged within the water space of the boiler below the water level, and freely intercommunicating one with another, especially at their lowermost parts, so connected with the furnace and with the smoke-stack, that the smoke shall traverse them in a downward direction from the furnace to the exit flue, so intercommunicating that the descending smoke in every flue, and in every branch and segment thereof, shall be left free to descend according as it is cooled and its gravity is increased, or to maintain a higher level according as it retains its heat rarefaction, so that the descending smoke preserves in all the flues at the same level a uniform temperature, a thermostatic equilibrium not liable to be disturbed by variable drafts, and that smoke which has cooled the most is at all times foremost in the descent.

Experiments have fully shown that a fire in the double chambered furnace with thermostatic flue system as described, will, if quickened by a steady and powerful indraft of air, driven by a flue exhauster working in the distal end of the discharge flue, burn with an energy that no carbonaceous combustible can withstand. The gaseous products of such combustion as delivered at the exhaust, consist almost wholly of carbon dioxide, nitrogen and steam, without a particle of dust, smoke or cinder. A weak, unsteady draft will not secure perfect combustion in any furnace; the strong, uniform, artificial draft, is a *sine qua non*.

When the furnace and thermostatic flue system combined are inclosed within a boiler shell, and are surmounted by an annex boiler, whose upper part is the steam dome, and whose base and fire plate is the crown-sheet roof of the combustion chambers, the construction as a whole constitutes a thermostatic steam generator. It is to be fitted with all requisite supplementary apparatus and self regulating attachments, and jacketed.

Water is almost an absolute non-conductor of heat by continuity. Neither water nor gases transmit heat from above downwards. In the thermostatic steam generator this thermic law finds a practical application. In the annex boiler, above the upper chamber of the multitubular flue system, steam is formed, and the boiling water is violently agitated. Below the annex boiler the water never boils, and its temperature diminishes progressively down to the bottom of the water space; no bubbles rise therefrom; there are no interstratic currents; all is motionless there, save that the feed water, which is added little by little, uplifts the mass integrally of which it forms the base. In the water outside of the flues, as in the hot gases within them, like temperatures rest in horizontal planes throughout, but from top to bottom of every vertical section of the water space, each horizontal plane is a little cooler than the one next above it. The intensest heat of the furnace is in the summit of the combustion chambers, underneath the fire plate of the annex boiler; and as the fuel gases descend thence through the flue tubes and the lower chamber, they impart their heat to the water surrounding them, until they reach the escape flue comparatively cold; and, conversely, the water entering the boiler at the bottom, is heated as it rises, step by step, in apposition with warmer and warmer strata of gases, until at length, already surcharged with heat, it comes upon the fire plate of the annex boiler and is almost instantaneously converted into steam. The product is dry steam, and the rate of production is believed to be unrivaled. The patentee states that no steam generator other than the thermostatic, can produce so much steam per pound of coal consumed, or discharge its gaseous products of combustion at so low a temperature. Of the numerous possible constructions of the thermostatic steam generator, we regard the simplest as the best. The designs for use at the Patent Office were necessarily complicated.

The artificial draft preferred for use with the steam generator, is made by fitting a steam pipe into a narrow flue so as to terminate centrally therein, and discharge steam forth coincidently with the long axis of the flue. The outgoing steam, according to its tension, creates a vacuum in the flue behind the steam junction, sweeps the gases from the furnace onward, and mingles with them. This apparatus can produce a most economical artificial draft; it can yield a very powerful blast. When all the steam from the generator is passed through it, namely: under a pressure of three or four atmospheres, and the temperature of the fuel gases discharged therewith exceeds somewhat that of the steam, the mixture comprehends under a diminished tension all the heat-force developed from the fuel consumed. Such a mixture, of any desired steam pressure, can be used for heating purposes, or to operate engines on steamships or elsewhere, wherever a large quantity of low pressure steam is worked. A check valve fitted in the flue behind the steam junction acts automatically and prevents reversal of the draft.



A boiler-spray from the coldest water in the boiler is employed to condense the exhaust steam from high pressure cylinders, or temper the products of combustion employed as a source of motive power.

Moreover, the two-chambered furnace and thermostatic flue system are adaptable to hot air furnaces, which, it is claimed, will unite a saving of two-thirds of the fuel with increased heating capacity, and at the same time give perfect security against the smoke nuisance and the dangers of overheated flues.

ON the first of January, 266 applications were recorded at the English Patent Office, the largest number thus far. On that day the new act went into operation.

New Method of Electric Lighting.

THE Gaulard-Gibbs method of electric lighting, of which an illustration may now be seen over a section of the Metropolitan Railway, London, is the latest development in the utilization of electricity as an illuminant. The chief characteristic of the new system consists in the use of secondary generators. The company are now illuminating the stations at Notting Hill Gate, Edgeware Road, Gower Street, King's Cross and Aldgate. For this purpose, the electricity is developed at Edgeware Road by an engine of 30 horse-power. The peculiarity of the system is, that the main current generated at the central station, when conducted along the wire to the subsidiary stations, is not, as is almost universally the case, transposed directly into light, but is passed through a secondary generator, in which the potential is varied as may be required for incandescent or arc lamps, or for the production of mechanical power. The primary circuit, which consists of a cable of four millimetres, or about one-sixth of an inch in diameter, is fifteen miles long, and is metallically closed with the generating dynamos. It is worth mentioning, as a notable fact in connection with this system, that whatever may be the electro-motive force traversing the the circuit, the cable may be touched at any point throughout its whole length without danger. The chief difficulty hitherto experienced in the transmission of electric energy has been that of supplying a current which, whether utilized for lighting purposes or for driving machinery, should be of a potential variable according to the different requirements of consumers. Messrs. Gaulard & Gibbs' ingenious system for generating and applying the electric current has obviated that difficulty, and will enable consumers to manipulate electrical energy much in the same way as they do now gas and water, and to turn it into currents suitable for high or low-resistance lamps, for working machinery, for electro-chemical processes, and for various domestic appliances. Hitherto, great difficulty has been found in the lighting of incandescent lamps at any distance beyond 500 yards from the dynamo machine. Even a distance of 500 yards can only be accomplished by using conductors of large sectional area, as otherwise a very considerable part of the power of the engine would be used in heating the leads. The lighting of the stations referred to already between Notting Hill Gate and Aldgate (inclusive) is effected by a force of 30 horse-power, which is transformed by means of a Siemens alternating dynamo machine into a current of 2,000 volts and ten ampères. A remarkable feature in the transmission and distribution of electrical energy by this system is, that the loss in overcoming resistance remains constant in a line of given length, whatever the power transmitted may be. Thus, if required, an engine of 1000 horse-power might be substituted for the engine now in use, without any variance in the loss occasioned by overcoming the resistance of the conductor, provided the uniform value of the current remains fixed, as it would do. Taking the example of M. Gaulard, the loss of energy in transference on a circuit of 50 miles, formed by a cable of four millimetres (8 B W G) in diameter, would be 102 x 50 =5,000 ampères-volts, equivalent to about 500 kilogrammetres, or 6½ horse-power, no matter whether the force transported and distributed be one of 20 or 1,000 horse-power. Messrs. Gaulard & Gibbs believe that they have invented and perfected the only system which affords facile means for at once converting natural forces into electrical energy, and conveying and distributing them over great distances at a practically unlimited number of points. In conducting their experiments for arriving at new and improved methods for the application of electricity to various industrial and scientific pursuits, Messrs. Gaulard & Gibbs had the courage and the wisdom to leave the beaten track marked out by Faraday, which electricians in recent years have trodden over and over again, and to go back to the comparatively neglected researches of Ampère. Faraday's experiments had been pursued in reference to the action of magnets or of magnetized iron on bobbins of insulated copper wire, while those of Ampère had as a basis the influence exerted by currents in movement upon bobbins of insulated copper wire. It is needless to point out that Messrs. Gaulard & Gibbs' system for the utilization of electricity has been built upon the lines indicated by the experiments of Ampère, and that there is, therefore, a radical and material difference between it and the other systems, which spring more or less from the results achieved by Faraday in his researches in the domain of electrical science.

As the secondary generator is destined to play henceforth a most important and indispensable part in the transmission and distribution of electrical energy in its various forms, the following brief description of it may prove interesting. A cable, consisting of a central wire, having a sectional area of four millimetres, with six smaller cables wound round it, is rolled in parallel spirals upon a hollow cylinder. Each of the smaller cables is formed of eight insulated copper wires, of one millimetre sectional area. Several of these cylinders are fixed on the same stand, and are so united as to allow of the alternating current of the thick central wire to generate, by the influence of its movements, a current of different potentials on the fine copper wires. Thus the main current, which is alternating, is made at the different stations or points where the light or power is required to traverse the primary conductor, that is the thick central wire, which by the reversals of polarity and the alternation of the primary currents, generate in the copper wires secondary currents of a potential, suited for any purpose to which they may be applied. By means of a small handle or regulator, the consumer can, at his will, limit the number of cylinders through which the electric current passes to one or more, thus determining, according to his requirements, the production of electric energy. Another handle regulates the introduction into the cylinders of soft iron bars, by means of which the current may be increased or diminished, and a perfect regulation of the light insured. The soft, steady light obtained from this new system, is due to the fact that the electric current traversing the fine copper wires of the secondary generator depends only on the quantity of the primary current, and is not influenced by its electromotive force. It is characteristic of Messrs. Gaulard & Gibbs' secondary generators that they produce currents suitable to every kind of lamp, whereas in other systems each lamp requires a special current and a special dynamo machine. It is obvious that the employment of one principal wire of small dimensions for conveying the primary current throughout the whole circuit, however long, will effect a great saving. Indeed, it is evident that an important economy will be brought about in the leads alone

from the secondary generators to the lamps, which would always be close together—so important, indeed, that it would probably be represented by something like one-fifth of the outlay rendered necessary by the most economical of other existing systems, including the cost of the secondary generators, We speak of economy within the extreme limits possible by any other system; but, beyond a certain distance, there is no other system that can compete, under any conditions whatever, with Messrs. Gaulard & Gibbs'. Furthermore, it seems now demonstrated beyond a doubt that, except for small local isolated installations, electrical energy will in future only be employed, in the form of what Messrs. Gaulard and Gibbs have termed "secondary generators," that is to say, that the primary current from a dynamo machine will no longer be used for lighting lamps directly, but circulating on a metallically closed circuit, will be made the means of generating, at any number of points in that circuit, currents of any potential suitable for all domestic and mechanical purposes, and for various electro-chemical processes. The first application of the Gaulard-Gibbs system being for the production of light, it may be imagined that this is the direction of its development; but it must not be forgotten, that however important the distribution of light may be, that of power has a much wider and, indeed, almost indefinite field of development. The anticipations already shadowed forth as possible by scientific minds have now been brought within the sphere of practical application; and we have no difficulty in saying, that the important step taken by Messrs. Gaulard & Gibbs will mark an epoch of great importance in the history of electrical science. What is very unusual nowadays, we understand that the enterprise on which Messrs. Gaulard & Gibbs are embarked is one of a very exceptional character, seeing that no promoters, intermediaries, or financial agencies are mixed up with it. The system of secondary generators has been perfected by the unassisted labors and outlay of these two gentlemen, and we are informed that the capital of the company has been privately subscribed among friends.

The National Company for the Distribution of Electricity by Secondary Generators (Limited), have drawn up a project for the lighting of the Suez Canal throughout its whole course, and have presented it to M. de Lesseps, who appears to regard the project with much favor. It is not generally known in this country that ships, in passing through the canal, have to remain stationary during the night. If the canal were lighted, so that the shipping could pass through it at night as well as during the day, nearly half of the time at present occupied in getting from the Mediterranean to the Red Sea, and *vice versa*, would be saved. It is proposed to light the canal by means of 1,280 lamps placed on its banks, and on fixed beacons in the passage through the lakes. The primary current of 40,000 volts and 16 ampères required for supplying all these lamps would be generated by four dynamo machines of the capacity of 10,000 volts, and worked by a total horse-power of 850. The primary current would be transmitted on a cable 350 kilometres in length, formed by 18 wires (No. 19 B W G), the resistance of which would occasion a loss of about 10 horse-power. The total cost of the installation would be £81,750, and the expense of maintenance would be about £10,000 per annum. This would be a comparatively small outlay, which would benefit commerce, and doubtless pay the Suez Canal Company.

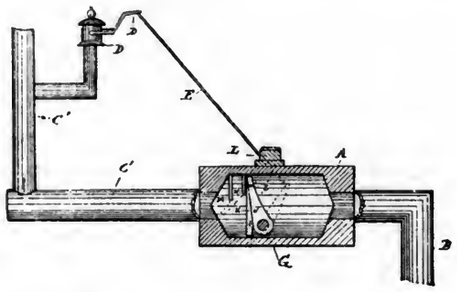
Device to Keep a Derailed Train on the Track.

AT No. 30 Pine street, this city, is to be seen a model of a device invented by A. A. Brooks, of Eau Claire, Wisconsin. Its object is to keep a train on the track after it has been derailed. The inventor, who has had many years' experience as a railroad man, is sanguine that his mode of preventing the serious results inevitable under existing arrangements, when the train leaves the rails, is both efficient and practicable. We think it well worthy the attention of companies who compete keenly for passenger traffic. Any one of these which could advertise that its trains are so provided that even derailment could not endanger the lives of its passengers, would have a very decided advantage in competition.

The Brooks device provides what is virtually a continuous guard rail, in a second set of wheels on the axles of locomotives and cars, of sufficiently smaller diameter than the running wheels to be out of the way when these are in their proper place on the rails, but wide enough to grip the rails and save the train from mischief in case it has left them. The working model shows that the device is capable of doing all that is claimed for it; and we are informed that a good number of railroad men who have examined it, speak of it in terms of approval.

Ellsworth's Alarm Indicator.

THIS device, invented and patented by Dewitt Ellsworth, Riverdale, Michigan, can be used with any inspirator or injector. It is fastened to the cold water pipe, and the water has to pass through the chamber of the alarm. There are valves so arranged in the chamber, that when the injector is at work, the water passes through freely. If the injector should refuse to work from any derangement whatever, there is a small whistle attached to the steam pipe of the injector, and a cord or wire running from the whistle lever to the shaft-arm, the steam takes the downward course, and the pressure against the valves causes the whistle to blow. Leakage or any cause whatever, will produce an alarm.



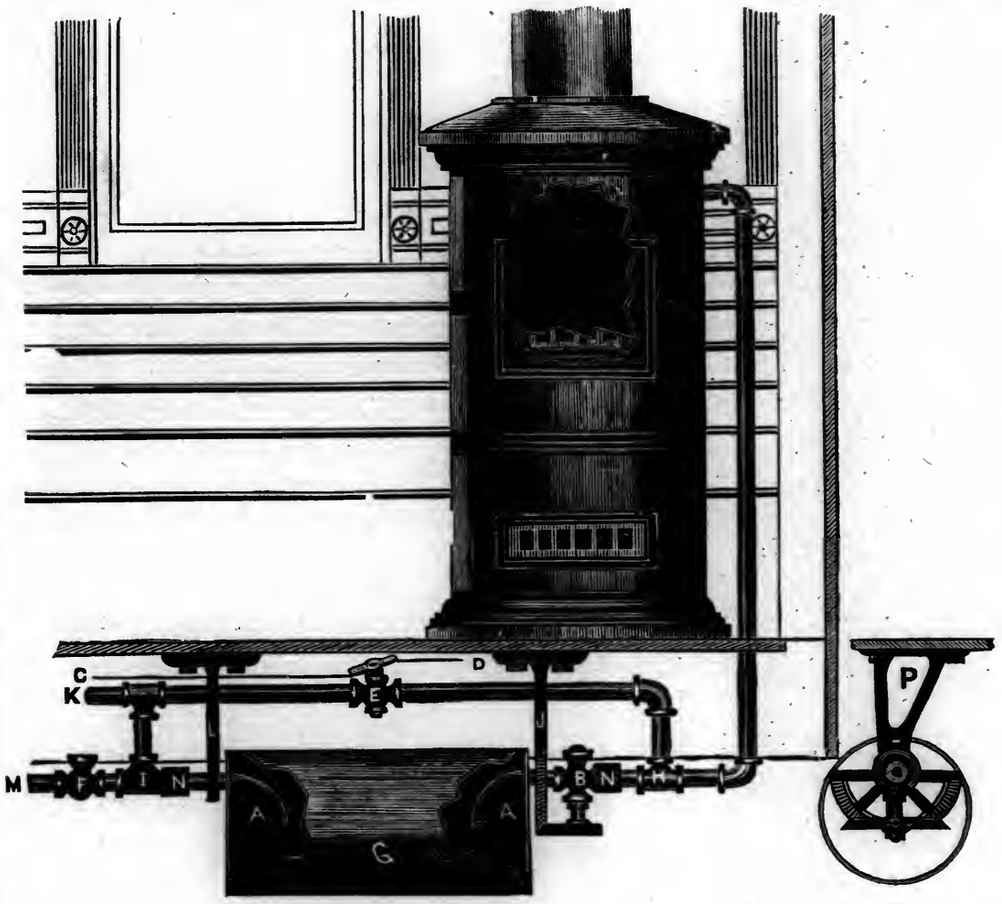
The above cut represents the alarm indicator. The chamber A, contains the stop M and valve K, to which is attached the shaft G with the lever F, which is attached by a cord or wire to the small whistle D. If from any cause the water ceases to flow, the steam forces the valve K open, which immediately blows the whistle, giving the alarm. It acts instantaneously.

WOOD, well saturated with oil, when put together, will not shrink in the driest weather. Boiled linseed oil is the best for general use. Crude petroleum on even old wheels is of great benefit.

Hittinger's Car Fire Extinguisher.

THE automatic device illustrated in the accompanying cut, is devised to extinguish fires in stoves, either in a collision or by the overturning of the coaches. It is the invention of C. Hittinger, Dayton, Ohio, patentee and proprietor.

The reservoir G, charged with salt water, is suspended from the bottom of the coach in hollow bearings, terminating in pipes near the bottom of the reservoir. These bearings are connected by packing points N, and both ends to fixed pipes, which arrangement admits of a free movement of the reservoir. When the coach overturns, the swinging of the reservoir opens the stop-cock B, which permits the water to flow freely through the pipe and rise to the burning fuel in the stove; the force carrying the water being compressed air, derived through the pipe M connected to the air pump, which operates the brakes. When a collision occurs, the rod D, extending to the ends of the coach, opens the stop-cock E, and the water is discharged into the stove as previously described. The pipe K extends to the center of the coach, the ends terminating in a hose coupling, to which a suitable hose may be attached to convey the water to the remotest parts of the coach. A valve is situated at the same point as that of the coupling, which is opened by hand that the water may issue through the hose if the coach catch fire.



HITTINGER'S CAR FIRE EXTINGUISHER.

TRAMWAY cars in Milan, Italy, are lighted by electricity, and it is said that some of the tramway cars in London are to be lighted in the same way.

Steam Automatic Car Brake.

THE patentees of the above named invention are Hugh McCalip and Marshall M. Nye, of Crawfordsville, Indiana. It is a simple attachment to the brake mechanism as it is now found on all freight cars, without making any change whatever, or interfering in any way with the hand brake.

The Steam Automatic Car Brake consists in attaching a steam cylinder immediately under the cab floor, bolted to the frame; or it may be attached under the forward end of the tender, in either case with suitable pipes to convey the steam to said cylinder. The piston-rod will be of such a length as to come on a line with the draw-bar head of the engine, on the end of which will be a buffer head. Under the tender and each succeeding car, held in suitable brackets, is a longitudinally sliding rod, so constructed as to be easily adjusted to the precise length of the car, including the draw-bars, and held in this position by coil springs. In the center of each rod is a projection or block facing upwards, fastened to said rod, upon either side of which rests the inner end of a lever which is pivoted to the car body, to which the brake mechanism is attached, and so arranged that either way the sliding rod passes from its center or resting place, the brake mechanism is put in operation and the brakes applied to the wheels.

In order to fully understand its operation, the reader must understand that the sliding rods are so arranged that when the train is fully made up of any number of cars, and the slack taken up till the draw-bar heads are

together, there is a continuous rod running through the entire train, the forward end of which is resting against the end of the pest rod proceeding from the steam cylinder. This being the case, in order to stop a train in motion it is only necessary to shut off the steam on the engine, when the momentum will immediately take up the slack. Then turn the steam into the cylinder, and the continuous rod is carried backward one foot, and the brakes on each car are simultaneously and instantaneously set. When the train is stopped it is only necessary to reverse the valve and shift the steam from the cylinder into the exhaust pipe; the coil spring immediately carries each rod attached to each separate car back to its resting place, and this motion relieves the brakes. There is no other connection between the cars but the link and pin, and the rod under each car is covered by the draw-bar head so that it cannot be affected by the bumping or jostling of the cars in switching or backing up. The discrepancy in the height of cars is provided for by so arranging the brackets in which the sliding rods are held, that the rods may be readily adjusted to a uniform height from the track. It is simple of construction and certain in its results, giving to the engineer complete control of his train.

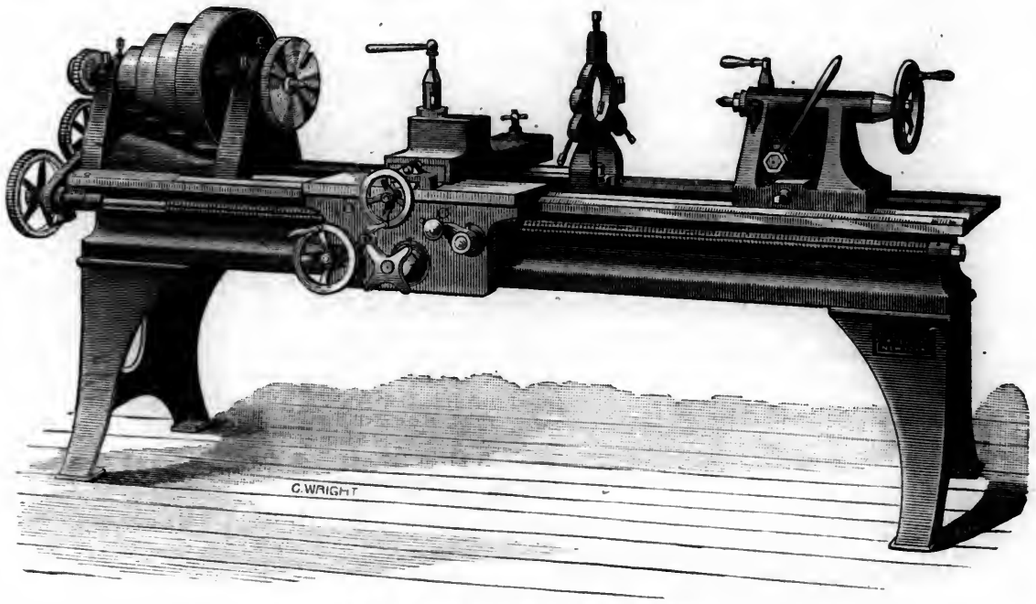
According to the best estimates which have been made the improvement will not cost more than fifteen dollars per car.

Lathe for Locomotive Builders.

FOR plain turning and screw cutting on work under three inches in diameter, such as studs, bolts and rods, it is frequently found desirable to employ a lathe designed especially for that class of work. The lathe illustrated on this page is particularly adapted to meet the requirements of locomotive and engine builders, being heavy and well made.

The head is not back geared, but has a four grade cone, the largest section of which is fourteen inches in diameter and takes a three inch belt, thus providing ample power for any work up to the diameter named above. The carriage is provided with an improved elevating rest by which an accurate adjustment of the tool is easily obtained, yet remains perfectly rigid under the heaviest cut. The feeds are positive yet entirely independent of the screw, which is in use only when required for screw cutting.

This Lathe is built by the Bridgeport Machine Tool Works, of Bridgeport, Connecticut, of which Mr. E. P. Bullard, of No. 14 Dey street, New York city, is proprietor. These Works have for the past three years made an exclusive specialty of a heavy sixteen-inch lathe, of which about three hundred have been put on the market. A heavy twenty-one-inch lathe is now nearly ready, and presents features of interest to the mechanic having use for superior tools.



LATHE FOR LOCOMOTIVE BUILDERS.

The Hungerford Metallic Cross Tie.

THE Hungerford iron or steel railroad cross ties are claimed to be superior to any wooden ties now in use, because they make a firmer, safer road bed, being made of either iron or steel. Their being made of either of these metals renders it impossible for the track to spread or the rail to get out of place, as the connection of the rail to the ties is so complete they cannot get loose, or separate the one from the other, by any possible action of the wheels of the locomotive or cars. The road-bed never has to be disturbed by digging the earth and loosening the material that supports the track, as in case of the wooden ties, which become rotten every two or five years, and have to be taken out and replaced by new ones, rendering it necessary to disturb the bed of the road. This operation makes it uneven, and breaks the steady motion of the cars at all points where new ties are placed among old ones. While wooden ties are bedded in the ground, a ditch is formed for the water to settle in, and the action of the cars on the ties in the water is continually working the earth into mortar, which soon becomes too soft for safety and must be continually watched and filled under with material tamped in, to secure any sort of safety at a large expense. The iron ties, on the contrary, lay on the surface of the road-bed, and by lowering the earth a trifle

between the ties, the water is made to run off the track, and the material that supports the ties is always comparatively dry and permanent. Moreover, while spikes driven in wooden ties are continually getting loose and unsafe, the iron ties have no spikes or bolts to get loose and are always found in place. The construction of the iron tie is such that it obviates the necessity of fish plates and bolts at the ends of the rails. Iron or steel ties are much cheaper than wooden to handle and transport, as their weight and bulk are only one-third of wooden ones. The metal tie also obviates the necessity of punching any holes in the rails. Doing this weakens ties, and costs considerable money, better saved.

E. B. Hungerford, Corning, New York, the inventor of the metal tie, is prepared to make contracts to furnish iron or steel ties for one-half the cost of wooden ones, for a term of thirty years.

The Phillips Station Indicator.

WE give a cut of this new device, patented by I. N. Phillips, of Nashville, Tennessee.



THE PHILLIPS STATION INDICATOR.

It consists of a box containing a revolving drum made of light material, and having printed upon or attached to its face, the names of the several stations of the route, arranged in the order in which they occur. There is in front of the box a window, through which the names may be read as they are brought into position by the pawl and ratchet mechanism at the end of the box. Upon the shaft of the drum are secured two ratchet wheels, the teeth of which stand in opposite directions; and the pawl lever is provided with two pawls, one for each ratchet wheel. These pawls are attached to a common pivot and are operated by a single spring. Either pawl may easily be made to act on its own ratchet. The pawl lever is connected with a registering bolt which is moved whenever the indicator is operated, and projects between pins at the end of the drum, limiting the motion of the drum to one step. The pawl lever is connected by a cord with the handle by which the indicator is operated. The lever is also connected with a gong, so that whenever the indicator is operated attention will be attracted to it by the striking of the gong. A brake spring is applied to the top of the drum to prevent it from moving too freely. The direction of the rotation of the drum is changed by shifting the pawls at the end of the route. The names of the terminal stations are inscribed at the ends of the box.

Thayer's Car Coupler.

THIS, the invention of William S. Thayer, of Owego, New York, is one of the few among the almost innumerable car-couplings being produced, which is in the sure way to be fully tested. It was applied to the superintendent's car on the Delaware Division of the Erie, in November last, and new cars are now being built in the Port Jervis shops, on which it will be placed and given a thorough trial.

Its peculiarities are better indicated in the claim of the specification forming part of letters patent No. 286,745, than in any other way, without the use of illustrations. The claim is a rock shaft or crank lever formed from a single rod, with its ends terminating in handles or cranks, and its central portion ⊔-shaped, on the same plan as the vertical portion of said handles or cranks, and adapted to be connected to a car directly between the bumpers and the strengthening-piece or sill thereof; the bumpers of a car, having formed therein, at or near their centers, where they join the strengthening-piece or sill, a groove or corrugation, in combination with a rock shaft or crank lever having its central portion ⊔-shaped, at its ends terminating in handles or cranks, the combination of bumpers each having formed therein a groove or corrugation, and provided with a metallic bushing, in combination with a rock shaft or lever; and the stringer or strengthening-piece of a railway car, having its ends grooved or corrugated upon their inner sides, in combination with a rock shaft or crank lever having its central portion ⊔-shaped.

Spike Puller.

KEYRAN J. DUGGAN, of Montgomery, Alabama, is the inventor of a new spike puller, the object of which is to provide a simple, practical, strong, and durable spike-pulling bar for use by railway track-men, lumbermen, and others requiring a tool of this class, which will not need frequent and expensive repairs.

The invention consists in a bar or lever fitted with a removable claw-head having an inclined tenon fitting in a flaring mortise of the bar, and locked in place by a tapering stud or key formed on the removable heel piece or block of the tool, whereby different claw-heads may be interchangeably and quickly fitted to the main bar, should

the claw head in use be accidentally broken, the construction thus also permitting the use with the one main lever or bar of claw-heads of varying size, shape and strength, as may be needed.

An advantage claimed for the tool above described and having removable and interchangeable claw-heads, over the common solid construction of the claw with the bar, is that broken claws may be replaced on the spot without loss of time, which is considerable when the bar is reheated and forged again to shape. The claw, and in the new tool the main bar and other parts are well calculated for durability in use, making the tool effective, and practical for its purposes.

Mr. Duggan has secured letters patent on his invention, concerning which he is prepared to furnish full particulars to those who write for them.

Knecht's Balanced Slide Valve.

IN this invention by J. C. Knecht, of Sigel, Illinois, the valve is rectangular in shape, and has an opening to permit the steam to exhaust freely. The valve at its ends is provided with glands, which are secured by screws, the glands being for the purpose of securing packing to the ends of the valve, which is clamped between them and the ends. A cover is open at the ends, and is secured to the valve seat in the chest over the valve, covering both the induction and exhaust ports. The cover on its under side is truly planed, so that the valve may slide accurately in it, the packing between the glands and valve preventing the passage of steam. The hood is somewhat shorter than the chest, so that the steam may enter freely at opposite ends, as the valve moves back and forth, in order to alternately reach the induction ports of the engine. The valve is operated by a rod, as usual, and being shorter than the cover, as it reciprocates alternately uncovers the induction ports and makes connection with the exhaust, so as to give motion to the engine.

W. L. BELLIS, 70 Michigan street, Cleveland, Ohio, is manufacturing a patented rim-plate for horse collars, which is of malleable iron, formed to fit on the rim of the collars where the hame ring rubs, and preventing the cutting out of the leather. It is fastened to the collar by screws or rivets of proper length. The use of the improvement is limited to cases in which the pole or wagon tongue is used. Mr. Bellis's claim is a perforated rim-plate for horse collars, having convexed outer surface and rounded edges, and curved longitudinally, whereby it is made to stand out from the face of the collar.

The Bridewell Motor Engine.

R. F. BRIDEWELL, No. 1606 Leavenworth street, San Francisco, is the inventor of an engine the mystery of which is not yet made public, and the use of which, he claims, will do away with all the expenses incurred by running the ordinary steam engine.

According to the statement of Mr. Bridewell, his engine will need no fire, no fireman and no engineer. It will obviate, therefore, the necessity of hauling away ashes, and of paying water bills. It will create no dirt, no dust, no smoke nor odor, require no governor or boiler, and no smoke stack. The power will be steady, and anyone will be able to handle this wonderful engine who can open and shut a valve. This valve will be marked like that of a steam gauge, and will be set to run any number of revolutions below the maximum, which is to be fixed by the maker at about 360. The power, he promises, will be steady and uniform, without cost and without limit, and the cost of the engine to make will not be greater than that of the steam engine, when of equal power and style of workmanship in finish. Moreover, the inventor says that the wear will be less than that of the steam engine, there being no slides nor packing, the journals and boxes being all the wearing parts, and these as handy to fit and to replace as those belonging to the steam engine. In point of room the new motor will be something smaller than the steam engines, when the boiler of the latter is taken into account, with coal room, etc. Oil will be needed for lubrication, and oil only. The engine will be trustworthy and will not explode, and there will be nothing to take fire or to cause a fire from the machine in any way whatever.

This astonishing invention is the result of thirty-two years' study, from 1851 to 1883. It will be brought before the public some time about the beginning of 1884. We shall then see what we shall see.

COMMMISSIONER FINK has in use at his offices, making up forms for averages, etc., a glutinous material which binds them into blocks of the thickness desired, in fifties, hundreds or other numbers, thus making pads, and avoiding the inconvenience of having sheets in a loose form, which are better used in the form of blocks or pads. The composition used is cheap, and applicable by an office boy. Particulars can be had from the Acme Composition Compay, No. 296 Pearl street, New York.

GOVERNMENT RAILWAYS OF NEW SOUTH WALES.

Contract for the Manufacture and Supply of 150,000 Tons of Steel Rails.

TO IRONMASTERS, MANUFACTURERS AND OTHERS.

The Government of New South Wales being desirous of encouraging the development of the local Iron Mining, and Iron and Steel Manufacturing Industries, are prepared to receive Tenders for the supply of 150,000 tons of Steel Rails, to be manufactured in the Colony.

Sealed Tenders marked outside "Tenders for the Manufacture and Supply of 150,000 tons of Steel Rails" will be received at the office of the Agent General of New South Wales, Westminster Chambers, Victoria street, London, S. W., not later than the 30th November, 1884, and at the Public Works Office, Sydney, not later than the 10th February, 1885, at which latter place the whole of the Tenders will be opened at 11 o'clock, A. M., on the day last named.

Each Tender must be accompanied by a Bank Deposit Receipt to the credit of the Commissioner for Railways in the sum of (£1,000) one thousand pounds sterling, as a guarantee of good faith. Such deposit will be returned to the unsuccessful Tenderers as soon as the Tenders have been declared, but the deposit of the successful Tenderer will be retained as security for the due performance of the Contract. Tenders not accompanied by such deposit will be absolutely rejected as informal.

Printed copies of preliminary Specifications and Conditions of Contract may be obtained on application at the office of the Commissioner for Railways, Sydney, and also from Messrs. R. W. Cameron & Co., of New York.

Delivery of the rails is to commence not later than 1st December, 1886, and to be at the rate of not less than 15,000 tons per annum.

Contractors must give full information and particulars in their Tender as to the process of manufacture they intend to adopt, and also whether they will be prepared to manufacture and supply, at rates to be afterwards agreed upon, such points, crossings, fish-plates, and fastenings, &c., as may be required from time to time for the rails under this Contract.

Contractors must state in their Tender whether they intend to manufacture the rails from native materials only, or whether, and to what extent, they intend to use imported material, giving a separate price per ton in each case.

As it is unlikely that intending Contractors will enter into an engagement of the above nature, without first satisfying themselves by personal inspection as to the position and extent of the raw material in New South Wales required for the manufacture of iron, every facility and information on this subject will be afforded on application to the Under Secretary of the Mines Department, Sydney, or to Messrs. R. W. Cameron & Co., of New York, and free passes will be allowed on the Government Railways of New South Wales to representatives of Tenderers wishing to ascertain the resources of the Colony.

For the information of persons desiring to Tender, it may be stated that the official returns show that there were imported into New South Wales and Victoria (the two Colonies join each other, and are connected by Railway) within the last 10 years 1,250,000 tons of iron and steel inclusive of the permanent way material required for Government and other railways constructed during the period mentioned.

CHAS. A. GOODCHAP,
Commissioner for Railways.

Department of Public Works,
Railway Branch,
Sydney, 1st October, 1883.

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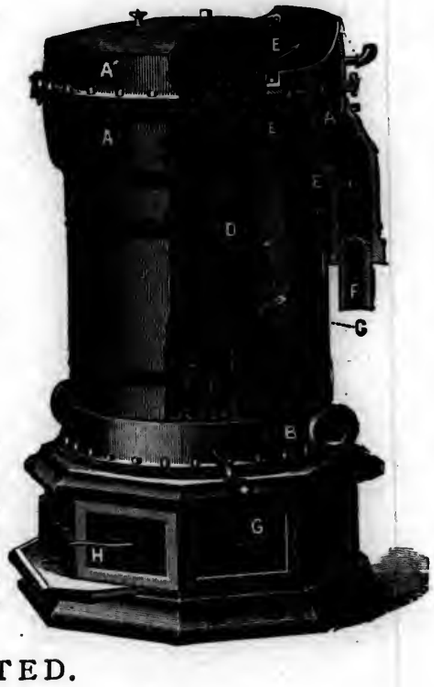
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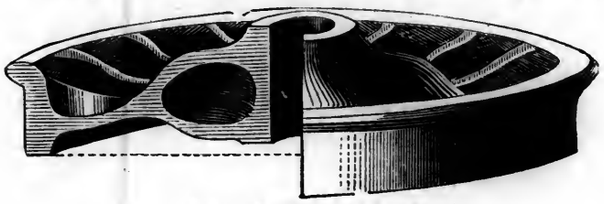
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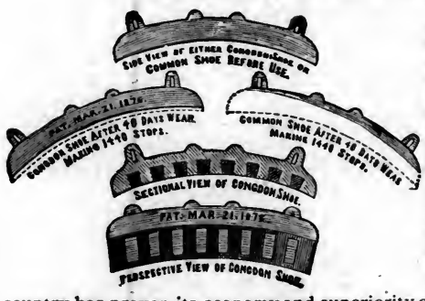
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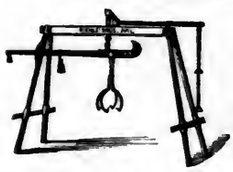
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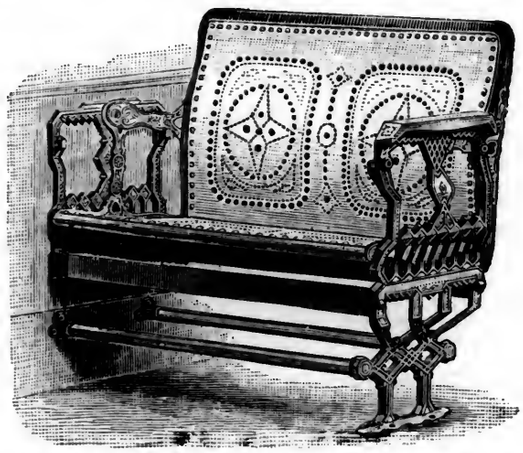
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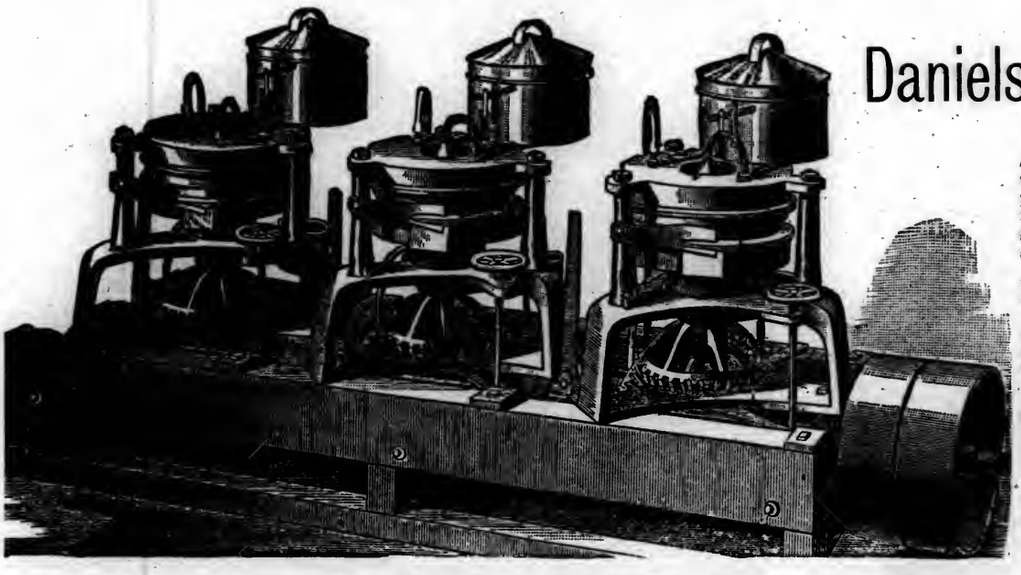
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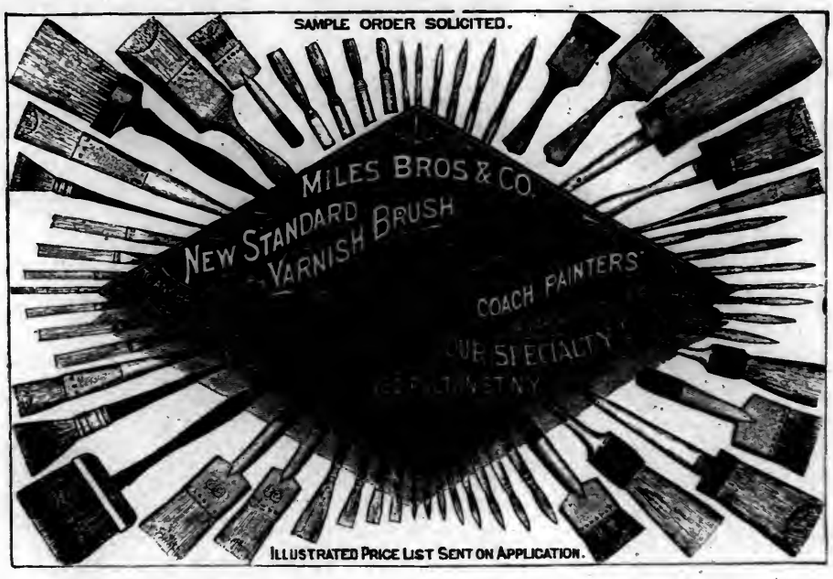
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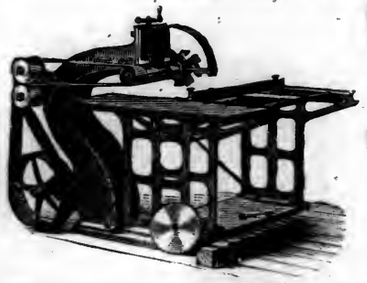
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AMERICAN
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Railroad Notes.

FINANCIAL.

THE governing committee of the New York Stock Exchange has voted to list $1,000,000 of additional first mortgage six per cent. gold bonds of the Oregon and California Railroad Company. These bonds are dated June 1, 1881, and mature July 1, 1921, and have been issued at the rate of $20,000 a mile upon the completed mileage of the company's railroad, extending from the sixty-fifth to the one hundred and fifteenth mile post south of Roseburg, Oregon, and comprising a total of 421 miles of completed road. First mortgage bonds of the Louisiana Western Railroad Company to the amount of $2,240,000 have also been placed on the regular list. These are six per cent. coupon bonds, due July 1, 1921. The governing committee have also granted the request of Kuhn, Loeb & Co., that "a further amount of $2,500,000 of the Pennsylvania Company's 4½ per cent. guaranteed first mortgage gold bonds, Nos. 12,501 to 15,000, which have been issued by the Pennsylvania Company, and guaranteed by the Pennsylvania Railroad Company, be placed upon the list of the Stock Exchange, making the total amount $15,000,000."

AT a meeting of the directors of the Ohio and Mississippi Railroad, held at Cincinnati, February 25, there were present Robert Garrett, James Sloan, Jr., W. T. Montague, J. L. Donaldson, C. R. Goodwin, Edward Higgins, Jr., A. B. Crane, W. E. Guy, and Judge A. B. Patterson, from Baltimore; Edward L. Whittaker, St. Louis; J. J. Jackson, Parkersburg; W. T. McClintick, Chillicothe, Ohio; J. M. Douglass, receiver, and W. W. Peabody, general manager. Resolutions were adopted authorizing the executive and finance committees to dispose of the new five per cent. mortgage bonds of the company to the amount necessary to pay all arrears of indebtedness, so as to release the railway and other property from the custody of the courts, and put the company again in control. Strong confidence is expressed by the committee in its ability to place the bonds with very little delay. Provision was made for an early application to the court for a proper order to restore the railway to the company, and for a statement of the receiver's accounts.

THE Lehigh and Wilkesbarre Coal Company, which, since the lease of the Central Railroad of New Jersey has passed under the control of the Philadelphia and Reading Railroad Company, held its annual meeting in Philadelphia, on February 28. The annual report states that the surplus for the year's business was $99,142. The total production of coal from the mines of the company for the year was 2,245,062 tons, and in addition 93,770 tons were purchased. The amount of $275,273 expended on colliery improvements and for other new work has been charged to the expense of business. The mortgage debt was reduced during the year $406,605, exclusive of the $34,015 deposited with the trustees for the redemption of the Lehigh Coal and Navigation Company's bonds of 1894. The election for officers resulted as follows: President, W. H. Tillinghast; directors, H. S. Little, John Keen, George De B. Keim, C. C. Knight, F. A. Comly, and B. Willis.

THE annual report of the Chicago and Alton Railroad Company for the fiscal year ending December 31, 1883, gives the gross earnings at $8,811,000, as against $8,215,000 for the year 1882, of which $2,270,000 came from the passenger traffic and $6,198,000 from freight. The income account was swelled to $10,954,000 by other items of revenue, including the interest on bonds held by the company. The operating expenses were $4,880,000, as against $4,486,000 in 1882, leaving the net earnings $3,931,000. The disbursements, including interest and dividends, and $741,000 expended on equipment account, summed up $9,028,000, leaving a balance on December 31, of $1,927,000. During the year $73,000 of six per cent. sinking fund gold bonds and $8,000 of the Mississippi River Bridge Company were redeemed. The company owns 850 miles of main track, of which 750 are laid with steel. The stock and bonds of the company represent $26,310,000.

THE annual meeting of the Philadelphia and Erie Railroad Company was held in Philadelphia, February 11. The annual report showed operating earnings for the year to be $4,108,843; expenses, $2,620,823, and net earnings, $1,488,020. The extraordinary operating expenses were $10,000, and the actual revenue, which includes $4,892 from rents, $1,482,912. After deducting expenses of organization, interest, and drawback paid to the Allegheny Valley Railroad Company, there was a surplus of $215,336, being a gain, as compared with the previous year, of $117,636. The State tax on loans and bonded indebtedness which was paid in 1882, amounting to $46,835, having been declared illegal by the Supreme Court, has been refunded to the company. An election for managers to serve du-

ring the ensuing year was held, after which William Hasell Wilson was elected president, and Joseph S. Van Zandt, secretary.

THE statement of Receiver Clark, regarding the financial condition of the New York and New England Railroad, shows the gross unfunded debt of the company to be $2,337,600. Against this, the balance sheet contains a statement of accounts in the nature of assets amounting to $1,525,900. From this are deducted the value of supplies and material on hand, estimated amount of worthless accounts, doubtful accounts, and the reduction in value of 920 shares of capital stock from par at fifty to the market price at fifteen, leaving the quick assets of the company at $810,300. Deducting this from the unfunded debt of the company, (including interest accrued December 31,) the remainder is $1,527,300. The auditor's estimate of the fixed charges for 1884 is $1,232,600, which does not include the interest on the floating debt. This (if stated at $1,500,000 and borrowed at six per cent.) will add $90,000 per annum.

THE capital stock of the Pennsylvania Railroad Company has been increased $25,000,000 in the past three years, and so rapidly has it passed into the hands of permanent holders that there is less of the stock in brokers' hands now than there was at that time. The capital stock is over $90,000,000, in nearly 2,000,000 shares. The English are large holders of the stock, and at the time of the last dividend, about $1,000,000 was paid on this account to representatives of English holders. About 20,000 shares have been transferred to English account since the dividend. The largest individual stockholder of the company is a Greek merchant living in London, who holds 15,000 shares. William Thaw, one of the directors of the company, holds 11,000 shares; I. V. Williamson, a director of the Reading, has 8,000 shares, and H. Pratt McKean is credited with holding nearly as much.

RECEIVER WOODWARD'S preliminary report in the case of the Central Trust Company, of New York, against the Texas and St. Louis Railway, states that there are not sufficient funds in his hands to pay the employés of the road and the various amounts due the contractors for supplies, and accordingly asks for an order of court empowering him to issue debentures over and above the $16,000 already ordered to be issued to the amount of $184,000, at a rate of interest not exceeding seven per cent. The court granted the order. The total amount of wages due by the road to employés is $103,997.99. Besides this there is due the general officers and agents of the company, $7,196.94, and attorneys, $3,371.82. There was also due the employés of the road prior to November 1, 1883, $17,801.77, making an aggregate of $134,458.52.

THE gross receipts of the Philadelphia and Reading Railroad Company for January were $2,195,800.59, and expenses, including rentals and interest, $1,346,667.76, leaving a profit for the month of $759,132.83, being a gain as compared with the corresponding month of last year of $83,789.98. The loss of the Coal and Iron Company for the month was $91,666.40. The profit of both companies for the fiscal year to January 31 is $1,446,913.18, being a decrease of $61,729.89. This statement includes the following figures, representing the operations of the Central Railroad of New Jersey and branches for January: Gross receipts, $696,051.38; working expenses, $517,893.65; earnings, $178,157.73; rental, $470,232.66; loss for month, $292,074.93.

ON February 13, the Supreme Court of Pennsylvania reached a final settlement of the appeal of the Pennsylvania Railroad Company from the decision of the Court of Common Pleas, of Allegheny county, affirming the right of the city of Pittsburgh to tax real estate of the company used for the transaction of its business. On January 7, when the Supreme Court opened its sessions in Philadelphia, the decree of the lower court was affirmed, Judges Green and Paxson filing a dissenting opinion. In view of the great amounts of money in back taxes which were involved, a motion for reargument was made. This was refused by the court February 13, and execution proceeded against the property.

THE annual report of the Northern Central Railway Company, submitted at the meeting of the stockholders in Baltimore, February 28, shows that the gross revenue for 1883 was $6,088,130, and the operating expenses $3,831,604, leaving net earnings of $2,256,526, an increase as compared with the previous year of $298,672. After deducting interest, rentals, dividends, etc, the balance carried to the credit of profit and loss at the close of the year was $925,528. The revenue from passenger business for the year showed an increase of $46,601. The operating expenses for the year include $244,948, on account of additional tracks, sidings, and other facilities at Baltimore, Canton, and various points upon the line.

THE net earnings of the Chesapeake and Ohio in January, 1884, were $281,394.96; an increase of $29,425.27 over January, 1883. For the whole year 1883, the earnings were $3,906,791.79, and the expenses $2,553,492.47; for 1882, earnings, $3,334,976.91; expenses, $2,302,448.58, being an increase in net earnings of $320,770.99. The increase in net earnings by the Elizabethtown, Lexington and Big Sandy, during 1883, as compared with 1882, was $65,037,88. For January, 1884, the line earned $45,825.00, a decrease of $2,068.11 from January, 1883.

THE official statement of the business of all lines of the Pennsylvania Railroad Company, east of Pittsburgh and Erie, for January, 1884, as compared with the same month in 1883, shows a decrease in gross earnings of $355,124, a decrease in expenses of $50,202, and a decrease in net earnings of $304,922. All lines west of Pittsburgh and Erie for January, 1884, show a deficiency in meeting the liabilities of $106,556, being a decrease, as compared with the same period of 1883, of $328,366.

THE annual report of the Housatonic Railroad shows receipts amounting to $735,492.54. One hundred and ten miles of the road have been steel-tracked during the past year. The sum of $128,600.75 has been expended in repairs and permanent improvements, and $148,901.51 for taxes. These expenses, together with the rentals of branch roads and interest paid on bonds, leaves the net gain $103,350.30.

DURING January, 1884, the estimated earnings of the Illinois Central were $919,956; actual earnings in January, 1883, $1,101,658.79. Land sales in January, 1884, were 1,543 acres, amounting to $9,969.61; and collections in same period, $9,841.72. A dividend of six per cent. was de-

clared March 1. The annual meeting will be held on the second Wednesday of March, 1884.

THE gross earnings during the past year of the entire system of the Pennsylvania Railroad Company, an aggregate of 2,036 of rail and sixty-six miles of canal, were $51,083,252.10, an increase over the previous year of $2,003,419.51. The aggregate working expenses were $31,747,150.44, and as compared with 1882 show an increase of $1,099,744.99. The clear earnings for the year were $9,552,646.73. Profit and loss account, December 31, 1883, aggregated $13,613,184.03.

THE statement of the Chicago, Burlington and Quincy Railroad Company, soon to be published, will, it is reported on excellent authority, show that the net earnings for the first eleven months in 1883 increased $200,000. The net increase for the year is estimated at $2,750,000, and the total net income will be about fourteen per cent. on the share capital.

THE Buffalo, New York and Philadelphia Railroad Company has given notice to the State Department of Pennsylvania, that it has increased its indebtedness to $1,700,000.

THE Denver and Rio Grande Railway has 1,679 miles in operation, an increase of 364 so far, during the present financial year. At the end of the first week in February its earnings thus far in the financial year were $571,000, an increase of $22,000 over same period last year.

ALL of the $3,000,000 4½ per cent. bonds of the Pennsylvania Railroad Company have been subscribed for. These bonds were offered to subscribers in London, Philadelphia, and New York simultaneously by the houses of J. S. Morgan & Co. and Drexel, Morgan & Co.

THE amount of the proposed issue of bonds by the Oregon Railway and Navigation Company with which to purchase the Columbia and Palouse Railroad was $2,700,000. The issue, as decided by the executive committee, will not be made, owing to legal technicalities.

AT a meeting of the Mexican Central Railroad directors, held in Boston, on February 9, it was announced that $1,076,000 in all had been subscribed in pursuance of the call for $1,000,000. The directors voted to increase the capital stock from $25,000,000 to $26,550,000.

THE financial statement of the Delaware and Hudson Canal Company for 1883, shows: Receipts from coal, $9,827,874.18; receipts from railroads, $7,417,643.16; miscellaneous receipts, $596,982.04; total receipts, $17,842,499.04. The net earnings were $1,995,842.54.

THE governing committee of the New York Stock Exchange has listed $2,500,000 of second mortgage bonds of the Chicago and Atlantic Railway Company, and also the twenty per cent. increase of the capital stock of the Pullman Palace Car Company.

THE financial statement of the Union Pacific Railroad for 1883 shows the gross earnings to have been $29,760,994 and the net earnings $13,090,823. The operating expenses of the road for the year were 56.1 per cent. of the gross earnings.

THE statement of the New Orleans, Mobile and Texas Railroad Company for the six months ended December 31, shows the net earnings to be $255,266. A dividend of one per cent. was declared.

THE earnings of the Florida Transit and Peninsular Railroad during the four weeks ended February 22, were $51,494, being an increase of $8,180 over those of the corresponding period in 1883.

PRESIDENT COLBY, of the Wisconsin Central Railroad, has secured from Boston capitalists $2,500,000 to complete the Central system from its present terminus, at Chippewa Falls, to St. Paul.

THE West Shore directors have agreed upon a plan to issue two classes of new bonds to the aggregate amount of five million dollars.

A SECOND mortgage of $4,000,000, given by the Rochester and Pittsburgh Railroad Company, has been recorded.

CONSTRUCTION.

PORTIONS of the Beach Creek, Clearfield and Southwestern Railroad, extending into the Clearfield coal regions, have been finished, and material is hauled over them. By the opening of spring the entire line will be in operation, and it will be an important feeder of coal to the Jersey Shore and Pine Creek Railroad, a branch of the Reading. The coal lands along the line of the road are being developed. For the first six weeks of the spring months, 100 cars of coal per day will be shipped over the road.

VICE PRESIDENT REED says there is not the slightest foundation for the intimation that the New York, New Haven and Hartford Railroad Company intended to build the New York, Connecticut and Air Line Railroad as a substitute for its own four-track scheme; and that the New York, New Haven and Hartford Railroad Company has not abandoned the plan for building two additional tracks, but is going right on with the work.

IT is reported that a controlling interest in the Petersburg and Weldon Railroad has passed into the hands of the Wilmington and Weldon Railroad Company, and that the latter road contemplate making City Point, Virginia, a shipping port for its freight. This will necessitate the construction of another branch road to City Point. The Petersburg and Weldon Road is sixty-four miles long, and forms a part of the Atlantic Coast Line.

THOMAS DICKSON, president of the Delaware and Hudson Canal Company, said recently that such improvements had been made in railroad transportation during the past fifteen years that canal transportation was no longer economical. For the purpose of railroad substitution the canal, he said, was worth from $5,000 to $8,000 a mile. The rumor has been revived that the company intends to build a railroad.

A RAILROAD from Hoboken ferry to Jersey City Heights, and thence to the northern part of Hudson county, will be begun as soon as the weather permits. It will cost about three hundred thousand dollars. An elevated railroad running cars by cable traction will be a novelty. The company having the scheme in hand is the North Hudson County Railway Company, of which James H. Bonn is president.

MAJOR ELLISON, of Port Stanley, has completed the new passenger depot for the Canada Southern at Niagara Falls, and will commence the erection of a large platform around the depot. Some idea of the size of the platform

may be had when it is stated that 32,000 feet of lumber and 12,000 feet of oak scantling will be utilized in its construction, and the cost will be in the neighborhood of $2,500.

THE scheme to build the New Orleans, Natchez and Northwestern road, from New Orleans along the west bank of the Mississippi River to the Arkansas State line, has taken a tangible shape. The projectors have secured over 100,000 acres of land. The Natchez, Red River and Texas road will require a new birth before work will be resumed and the road extended toward the Sabine.

THE Shade Gap Railroad Company are about to construct a narrow-gauge line from Rock Hill Furnace, Huntington county, Pennsylvania, to Burnt Cabins, Fulton county, fifteen miles. The new road will be a branch of the South Pennsylvania when completed. The capital is $100,000, with the right to increase it to $300,000. Edward R. Wood, of Philadelphia, is president.

IT is reported that the Northern Pacific Railroad Company will begin shortly the construction of an extension from a point just north of Wallula, on the Columbia River, to Puget Sound. Bids for a portion of the work have already been received. San Francisco will be reached from Tacoma by steamers owned and run by the Northern Pacific Company.

THE Pennsylvania Railroad Company is surveying a branch line from Aberdeen, on the Philadelphia, Wilmington and Baltimore Railroad, through Hartford county and into the canning district near Delta, York county. The Baltimore and Ohio Railroad Company will survey a branch from its Baltimore and Philadelphia line into the same territory.

BURNS & NOAKES have thrown up their contract on the Baltimore and Ohio extension to Philadelphia. This is in consequence of the recent decision in Hartford county, Maryland, in favor of the striking Italians. The decision was that all contractors are responsible for the debts of their sub-contractors. Their contract amounts to $500,000.

IT is estimated that to bridge the Mississippi at New Orleans, where it is 2,400 feet wide, would cost nineteen million dollars; but the matter is under consideration. An engineer proposes seven spans of three hundred feet each, one to be a draw; the piers to be creosoted piles, driven in clusters, and heavily capped and cased with iron.

GROUND was broken in Sheffield, February 4, for a railroad to connect that place with Birmingham. The western extension of the Georgia Pacific, from Columbus, Mississippi, to Birmingham, is to be completed and probably meet the Sheffield road near Jasper, about forty-five miles west of Birmingham.

THE Boston and New York Air Line Railroad Company has purchased the right of way for its line from the Stamford town line west to the Mianus River, and is negotiating for land west of the river to Greenwich.

THE new Schuylkill Valley branch of the Pennsylvania Railroad and the branch from Philadelphia to Chestnut Hill are nearly completed, and within a few weeks will be open for traffic.

THE Louisville, New Orleans and Texas Railroad Company announces that its southern portion from Memphis to New Orleans will be completed and ready for business on May 15.

ARTICLES of incorporation of the Kansas City, Des Moines and Northern Railroad Company have been filed. The object is to build a railroad between the cities named.

A CUT on the new South Pennsylvania Railroad three miles east of the Allegheny Mountain tunnel will be ninety-five feet deep and 2,000 feet in length.

THE whole length of the Jersey Southern Road, from Bay Side north, is being repaired. The lower end of the line will be raised about two feet.

A RAILROAD is to be built from Richmond, Virginia, to Ridgeway, North Carolina, so as to pass through Petersburg.

ALL the bridges along the line of the Baltimore Central Railroad Company are being strengthened.

THE gauge of the Philadelphia and Atlantic City Railroad is being widened.

THE South Pennsylvania Railroad is to be completed by January 1, 1886.

THE track of the Gettysburg and Harrisburg Railroad has been completed.

LEGAL.

UNDER an act passed by the Legislature of Arkansas in 1872, the Memphis and little Rock Railroad Company was reorganized. It retained the same name and succeeded to the property and franchises of the road, under the foreclosure of a mortgage of the original corporation and a conveyance under the decree of foreclosure. The trustees purchased the road at the foreclosure sale, and the bondholders organized the existing corporation. There was due to the holders of the old mortgage bonds $26,000,000 principal and $1,300,000 of interest. The capital stock of the new company was placed at $1,300,000. New mortgage bonds to the amount of $26,000,000 were issued to the trustees for the holders of the outstanding mortgage bonds, and the capital stock was apportioned pro rata among the holders of the bonds. Early in 1880 the majority of the stock was acquired by Marquand, Gould and Sage in the interest of the St. Louis, Iron Mountain and Southern Railway Company. They brought a suit in the name of the company in the United States Circuit Court against Robert K. Dow and others, trustees and holders of the $26,000,000 of mortgage bonds, to annul the bonds and mortgage on the ground that they were issued by the complainant without corporate power. The primary question in the suit was whether, upon the purchase of property, a corporation could mortgage what it had acquired in order to secure the purchase money. Judge Wallace rendered a decision, February 11, in which he held that the rights of corporations were the same as those of an individual in that respect. A general right to borrow money implied the power to mortgage all corporate property, except franchises, unless prohibited by their charter from doing so. In this case there seemed to be no reason to deny the power when the purchaser of the mortgage included the franchise and the whole property of the corporation. "The present case," he said, "is phenomenal in the audacity of the attempt to induce a court of equity to assist a corporation in repudiating its obligations to its creditors, without offering to return the property it acquired by its unauthorized contract with

them. It is now contended that, if there is any obligation on the part of the corporation to pay for the property it purchased, it is not to pay what it agreed to, but to pay a less consideration, because the property was not worth the price agreed to be paid. The court will not compel the bondholders to enter upon any such inquiry. They were entitled to set their own value on their property." The bill was therefore dismissed, with costs.

THE finding of Referee H. S. Cutting in the matter of the petition of the New York, Lackawanna and Western Railroad for the appointment of commissioners to appraise certain lands of the Union Steamboat Company, Buffalo, goes over the whole ground. The Union Steamboat Company's docks are situated on Central Wharf, and the company does a large transportation business on the lakes. It set up ten objections to the granting of a commission, the chief of which was that the land sought to be taken now serves a public use, and therefore cannot be appropriated under the law of eminent domain. The referee holds, however, that the steamboat company's use of the lands is not, properly speaking, a public use. What constitutes public use he defines as follows: "The use or trust for a public use must attach to and be impressed upon the land itself, so that by the mere voluntary act of the person or corporation exercising the use such use or trust cannot be changed and the land converted to some other use." The referee holds that the steamboat company owes no duty to the public of which it cannot divest itself at any moment.

IN Sulzbach Bros. et al. *vs.* Thomson's administrators et al., recently decided by the United States Circuit Court, Eastern District of Pennsylvania, T. and C. were trustees under a mortgage, their duty being to certify to the performance of certain conditions precedent to the issuing of the bonds of a railroad company secured by said mortgage; said bonds were taken by S. The complainant S. charged the trustees with negligent and faithless performance of duty, attributed loss sustained by them to this cause, and sought reimbursement from the estate of T., who is now deceased. The court being satisfied that a loss did result from the negligence of T., referred the case to a master to ascertain the damages, with instructions, that the proper measure of damages would be the difference in value of the property as actually sold under foreclosure had the trustees performed their full duty. The claim of negligence against C. was not sustained by the court, and the bill as to him was dismissed.

AT Wilkesbarre, Pennsylvania, February 7, the North and West Branch Railroad, a branch of the Pennsylvania Railroad, was charged with a nuisance in obstructing a public road in Conyngham Township. It was alleged by the prosecutor that the company had taken possession of a part of the roadway without providing another roadway. In addition to this it was stated that in the construction of their road they had thrown rocks and other obstructions upon the portion of the road they did not occupy. Ex-Attorney-General Palmer, who appeared for the company, maintained that at the time the alleged nuisance was committed the railroad was not completed, and that a reasonable time should elapse before the company could be obliged to open another road, if they had occupied a portion of any highway. After argument the case was given to the jury, who returned a verdict of guilty.

F. W. CLARK, of Dedham, has filed a bill in equity in the Supreme Court, Boston, against Charles Van Brunt and Albert S. Bigelow, of Boston, trustees, and the New York and New England Railroad Company, in which the complainant asks for an accounting of the bonds issued on January 1, 1854, by the Boston Central Railroad for $1,200,000. Mr. Clark also asks for an annual compensation of $400 since 1862 for services as trustee of said mortgage and money expended. These bonds became due in January, 1874, and the New York and New England Road has succeeded to the liabilities of the Boston Central. The bill asks that an order for the sale of the New York and New England property in Massachusetts shall be given by the court.

THE case of Smith against the New York, Susquehanna and Western Railroad Company was before the Supreme Court, Trenton, New Jersey, on the twenty-first ult., on a rule to show cause. One of the grounds of the defence was that the plaintiff was riding on Sunday on the trains of the defendants. The company claimed that plaintiff was not riding as a matter of charity or necessity, and that consequently plaintiff violated a State law. The court held on this point that as a proviso of the statute permitted one train each way on Sunday, citizens had a right to use the trains so run. The rule was discharged.

THE suit of Page, Newell & Co., of Boston, against John Proctor, of Hamilton, railway contractor, which has been pending for many months in the Court of Common Pleas division of the High Court of Justice, was concluded February 10, at Toronto. The plaintiffs sought to compel the defendant to carry out a contract to purchase $40,000 worth of steel rails. The plaintiffs contend that they were ordered and that they were prepared to deliver them, but the defendant, having failed to secure the contract as he expected, afterward refused to accept delivery. The court decided in favor of the defendant.

ON February 28, at San Francisco, Circuit Judge Sawyer decided the railroad tax cases in favor of the Central, Southern, and Northern Pacific Railroad Companies, except in Monterey, Santa Clara, San Mateo, and Colusa counties. The attorney for the railroads stated that the companies would waive judgment and pay the face of the taxes. This causes a loss to the State of $1,000,000, the difference between the face of the taxes and the amount sued for. The same day Governor Stoneman obtained an injunction restraining Attorney-General Marshall from compromising the railroad tax cases.

IN 1872 a narrow gauge railroad was built between Kansas City and Independence, the county seat, six miles, being aided by a township subscription of $250,000. In 1881 the Missouri Pacific bought the road and tore up the track. The county brought suit to compel its replacement. A case in the Supreme Court has been compromised, the Missouri Pacific agreeing to replace narrow-gauge by a standard gauge, to be completed during the present year; giving the people the benefit of two roads between Kansas City and Independence.

JUDGE BAXTER, in the United States Circuit Court, Cincinnati, February 1, dismissed the rule against a claimant who had brought suit against the receiver of the Toledo, Cincinnati and St. Louis Railroad Company, in

the Mercer Common Pleas Court. He notified the claimant that he and his attorneys would be liable to a charge of contempt if he did not forthwith dismiss the suit in the Common Pleas Court. Judge Baxter said the United States Circuit Courts were the only ones having jurisdiction in suits against receivers of those courts.

JOSEPH DISHLER, a brakeman of the Central Railroad, was in 1871 thrown from a passenger train by the breaking of a brake wheel, sustaining severe injuries, having since been unable to work. He sued the company for damages, and the case has been in litigation for several years, going up to the Court of Appeals on a verdict of $3,000 for plaintiff, but was sent back for retrial. The case was closed in the Supreme Court, Lockport, New York, February 28, by a verdict of $5,500 and costs for the plaintiff.

IN the case of the appeal of the Central Railroad Company of New Jersey from the verdict of $30,000 damages awarded the heirs of Mr. Demorest, of Paterson, who was killed in the Parker's Creek accident in 1882, the Supreme Court of New Jersey has set aside the verdict as being excessive, and ordered a new trial. The verdict of $25,000 damages in the suit of the heirs of Mr. Woodruff against the same railroad company for damages for death caused by the same accident was affirmed by the Court.

THE United States Circuit Court, Philadelphia, has decided that the wages certificates issued by the Philadelphia and Reading Railroad Company are not taxable, and have filed a decree peremptorily enjoining the collection of a claim for a tax on them filled on the part of the Government. The certificates were issued in 1878 and 1879. They were receivable for debts due the corporation and the Philadelphia and Reading Coal and Iron Company.

THE Supreme Court of Arkansas, has decided that by consolidation of the Iron Mountain and Cairo and Fulton Railroad Companies exemption from taxation under the old Cairo and Fulton Railway charter is forfeited, and the company must pay the state and county taxes. The case will be taken to the United States Supreme Court.

CHARLES PALMER, while employed as baggage master on the Pittsburgh, Fort Wayne and Chicago Railroad, received injuries in a collision, crippling him for life. He brought suit in the Common Pleas Court of Mahoning County, Ohio, at Youngstown, for damages. The case was settled by the company paying him $25,500.

THE Supreme Court of Pennsylvania has decided, in Pullman Palace Car Company *vs.* Gardner, that where a passenger on a sleeping car has been robbed, evidence to the effect that another passenger in the same car was also robbed on the same night, is admissible as bearing on the want of proper care on the part of the company.

IN the Superior Court, Boston, February 21, in the case of Willard A. Swan against the Boston and Albany Railroad Company, an action of tort to recover damages for injuries received by being struck by an engine of the defendant corporation at South Framingham, the jury found for the plaintiff in the sum of $6,125.

THE Federal Courts at Nashville have decided that the act of the legislature of Tennessee appointing a railway commission to have supervision of railroads in that State is unconstitutional, and has granted an injunction restraining the commission from interfering with the business of the railroad companies.

IN an action on the case, to recover for an injury caused by the use of defective machinery, there is no error in refusing to allow the party to read to the jury certain extracts from a standard work on mechanics. North Chicago Rolling Mills *vs.* Monka, 107 Illinois.

THE injunctions at Pottsville in the cases of the Reading and Mahanoy and Pottsville Railroad Companies have been postponed until March 14.

ELECTIONS.

AT the annual meeting of the stockholders of the Lackawanna and Pittsburgh Railroad, held in New York, the following gentlemen were elected directors: Archer N. Martin, George D. Chapman, Frank Jenkins, Clinton R. Weeden, Henry A. V. Post, A. J. Wellman, A. W. Miner, C. E. Kimball, Oliver Watson, J. N. Borland, Jr., Cyrus H. Witherbee, Frank S. Smith, and M. S. Blair. Executive officers were elected as follows: President, A. N. Martin; vice-presidents, F. S. Smith and Frank Jenkins; secretary and treasurer, C. E. Kimball. The Lackawanna and Pittsburgh Railroad has been largely under construction during the past year. There are now seventy-two miles of line owned by the company in operation, and forty additional miles have been completed and will be soon opened for traffic. The Lackawanna and Pittsburgh has trackage agreements with the Buffalo, New York and Philadelphia Railroad and the Delaware, Lackawanna and Western.

AT the third annual meeting of the stockholders of the Boston Stock Car Company, Boston, held February 2, 1884, the following gentlemen were elected officers: Joel M. Holden, president; George D. Burton, secretary and treasurer; Clarence Hale, assistant secretary; Edwin F. Perkins, general manager, and Louis C. Southard, counsel. The following were elected directors: Percival L. Everett, James Sturgis, Joel M. Holden, E. F. Perkins, David H. Goodell, James A. Hathaway and George D. Burton. The secretary's report is a very encouraging document, showing large business done by the company in the past, with the certainty of extraordinary expansion. It seems that cars after the company's patents can be put into service for nearly the same figures as an old style car.

THE adjourned annual meeting of the Vermont and Canada Railroad Company, was held at Bellows Falls February 18. The road having been practically merged into the Consolidated Vermont, it was understood in advance that the old board of directors would retire, hence there was a very large attendance. Six thousand eight hundred and ninety-five shares voted for Charles E. Billings and A. S. Hall, of Boston, 5,605 for Henry D. Hyde, Thomas H. Perkins, and Augustus Russ of Boston, and John L. Mason and Jed P. Clark, of Vermont, and 1,290 for the members of the old board not named above. All but five votes for the new board were cast by the son and attorney of the president of the consolidated company.

THE stockholders of the Providence and Worcester Railroad held their annual meeting at Providence, February 4. The following directors were chosen: George A. Leete, Gideon L. Spencer, Elijah B. Stoddard, Lyman A.

Cook, Estus Lamb, Moses B. I. Goddard, Frederick Grinnell, Joseph E. Davis, Oscar J. Rathbun, David K. Phillips, Josiah Laselle, Jonas G. Clark, Benjamin F. Thurber, Charles E. Whitin, John W. Davidson. Concerning terminal facilities in Providence, the directors were authorized to take all the necessary measures substantially in accord with the plans of the commissioners which were adopted by the city council of Providence and approved January 3, 1884.

THE annual election of the Delaware, Lackawanna and Western Railroad, February 26, resulted as follows: President, Samuel Sloan; secretary, Frederick F. Chambers; treasurer, Frederick H. Gibbens; managers, John I. Blair, George Bliss, Percy R. Pyne, William Walter Phelps, Wilson G. Hunt, Elias S. Higgins, Benjamin G. Clarke, Jay Gould, Sidney Dillon, Russell Sage, Edgar S. Auchincloss, Andrew T. McClintock, Abraham R. Van Nest, and Gardner R. Colby. The two last named gentlemen succeed the late William E. Dodge and E. W. Holbrook. There are 1,670 stockholders in this company, and 320,000 shares were voted, all for the above ticket.

AT the annual meeting of the Boston and Albany Railroad held in Boston, February 13, Jarvis A. Dunham, of Pittsfield, presided. It was voted that the directors be requested to publish in the next annual report so much of the charter and by-laws and legislative action as shall practically constitute a history of the road. The old board of directors was unanimously reëlected. A motion that the directors be instructed to discontinue the running of gravel trains on Sunday drew out much discussion, but was finally referred to the directors to do with it as they might deem advisable.

AT the annual meeting of the Boston, Barre and Gardner Railroad, held in Boston, February 6, the following directors were elected: Calvin Foster, W. W. Rice, Charles G. Reed, S. Salisbury, Jr., S. R Haywood, A. George Bullock, Henry M. Witter, William H. Morse, and E. W. Vaill, of Worcester; Nelson D. White, of Winchendon, and Franklin Eaton, of Gardner. The directors elected William H. Morse, president, W. E. Starr, clerk and treasurer, and H. H. Marshall, superintendent. Ex-president Witter remains chairman of the executive committee.

THE stockholders of the Cincinnati, New Orleans and Texas Pacific (Cincinnati Southern), at the annual meeting, December 18, elected John Scott, T. T. Gaff, Briggs Swift, Augustus Wessel (vice Edgar M. Johnson), Otto Plock of New York, W. A. Goodman and Alex. McDonald directors. A committee was appointed to examine the management of the road, one of the stockholders declaring there was a sum of $220,000 not accounted for. The annual report shows that no dividend was declared the past year, but there is a surplus of $5,000.

THE annual meeting of the stockholders of the Northern Central Railway Company was held in Baltimore, February 28. The following are the newly-elected directors: George B. Roberts, Wistar Morris, Samuel C. Huey, John P. Green, Edmund Smith, George Small, B. F. Newcomer, S. M. Shoemaker, J. N. Hutchinson, Dell Noblit, Harry Walters, and Henry Gilbert. At a meeting of the directors held subsequently, George D. Roberts was elected president; Frank Thomson, vice-president; Stephen W. White secretary, and John S. Lieb, treasurer.

THE annual meeting of the stockholders of the Burlington, Cedar Rapids and Northern Railroad was held in Chicago, February 26. Four of the five retiring directors were reëlected: the fifth, John I. Blair, was succeeded by R. R. Cable. At a meeting of the directors subsequently held the following officers were elected: President, Judge Tracy; treasurer, H. H. Hollister; assistant treasurer, C. Stickney: secretary, S. S. Dorwart. The control of the road jointly by three interested companies seems to have been determined upon.

AT the annual meeting of the officers of the Western and Atlantic Railroad, the reports showed every department of the road to be in a satisfactory condition. It is now being laid with steel rails the entire length. Last year about thirty miles of steel rails were laid. All the bridges have been repaired. The old officers were all reëlected, with the exception of Colonel E. W. Cole, who tendered his resignation as vice-president. W. C. Morrill was elected to fill the vacancy occasioned by Mr. Cole's resignation.

THE stockholders of the Belvidere, Delaware Railroad Company, and the Flemington Railroad and Transportation Company, both of which are controlled by the Pennsylvania Railroad, held their annual meetings in Camden, February 4, and elected officers. The Belvidere, Delaware Company elected William H. Wilson president, in place of the late Strickland Kneass.

AT a meeting of the directors of the Western and Atlantic Railroad, held at Atlanta, February 7, the old officers were reëlected, except W. C. Morrill, who is elected to the vacancy caused by the resignation of E, W. Cole, one of the directors.

THE directors of the Lehigh Valley Railroad Company held a meeting February 12, at which Elisha P. Wilbur, a nephew of the late Asa Packer, was elected president, to fill the vacancy caused by the death of Harry E. Packer.

AT the annual meeting of the Pittsfield and North Adams Railroad Company, February 13, last year's board of directors was unanimously reëlected.

AT the annual meeting of the stockholders of the Scioto Valley Railway, held at Columbus, Ohio, the old board of directors was reëlected.

PERSONAL.

THE following are the latest appointments by the Northern Pacific: J. M. Hanaford, general freight agent in charge of main line and branch office at St. Paul; Charles S. Fee, general passenger agent in charge of both passenger and ticket departments of the main line and branch office at St. Paul; H. C. Davis, assistant general passenger agent at St. Paul, and A. D. Charlton, general Western passenger agent, with office at Portland, Oregon. The official designation of A. L. Stoke is now assistant general freight agent, with office at Portland, Oregon. The appointments took effect March 1, 1884.

THE following has been given out for publication: "Upon the appointment of the receiver of the North River Construction Company all the powers of the board of directors and officers passed to the receiver. The company having completed the work for which it was organized, it remains only for it to settle its accounts and

liquidate its indebtedness. The directors are enjoined from exercising the duties usually devolving upon the board. General Winslow thereupon resigned his position, leaving Colonel Walter Katte, vice-president."

THE general manager of the West Lancashire Railway has addressed the following to the British Women's Temperance Association: "I have the pleasure to inform you that this company has no refreshment rooms at any of its stations where intoxicating liquors are sold. It may be also interesting for you to know that the whole of the company's officials are total abstainers, and that no man receives an appointment under the company unless he has been previously an abstainer of some standing."

THE following changes have been made in the organization of the New York, Ontario and Western Railway Company: 1. The offices of superintendent of motive power, traffic manager, chief engineer and engineer of maintenance of way are abolished. 2. J. C. Anderson to be general passenger agent, in place of Henry Monett, resigned. 3. The duties heretofore performed by the chief engineer and traffic manager will be devolved upon the general superintendent under the direction of the general manager.

ELISHA P. WILBUR succeeds Harry E. Packer as president of the Lehigh Valley Railroad Company. Mr. Wilbur is about fifty-one years of age and a nephew of the late Judge Asa Packer. He was for many years the confidential adviser of that gentleman, and has for many years been a director of the Lehigh Valley Railroad Company. After the death of Robert A. Packer, Mr. Wilbur became manager of the Northern lines.

COLONEL A. A. TALMAGE, general transportation manager of the Missouri Pacific Railway system, has been appointed fourth vice-president of that system, with jurisdiction extending over the entire Wabash line. This appointment retires Colonel Andrews from the general superintendency of the Wabash, but he has been appointed consulting engineer of that road.

WHEN F. B. Gowen retired from the presidency of the Philadelphia and Reading Railroad Company he resumed the practice of law. He has taken up all questions of law affecting the Reading system, and in the course of time will extend his legal scrutiny to all branches of railroad in Pennsylvania in which Mr. Vanderbilt is interested.

C. C. MIDWOOD, secretary for general manager Merrill, of the Boston, Hoosac Tunnel and Western road, is arranging a table of railway signals to be laid before the commission which recently decided upon the standard time, with a view to secure a standard code of signals.

VICE-PRESIDENT Charles Hartshorne will serve as president of the Lehigh Valley Railroad until a successor to ex-Judge Packer shall be chosen. The board of directors have power to fill the vacancy until the next annual meeting of the stockholders.

A. S. MANERY, formerly station agent at Ypsilanti for the Michigan Central, has received the appointment of general freight and ticket agent of the Indianapolis and St. Louis Railroad, with headquarters at Anderson, Indiana.

ERWIN I. CASE, of Peoria, was appointed by Judge Treat, of the United States District Court, St. Louis, receiver of the St. Louis, Hannibal and Keokuk Railroad on February 7. He is placed under bond of $100,000.

THE Rutland (Vermont) Railroad Company has sued ex-president John B. Page for $200,000 for moneys claimed to be due the company, which, it is alleged, were had and retained by him during his official connection.

GENERAL SUPERINTENDENT Bowen, of the New York, Lake Erie and Western Railroad, has been promoted to be one of the vice-presidents of the company, to succeed Robert Harris, resigned.

THE directors of the Philadelphia and Long Branch Railroad, at a meeting February 16, elected William Hasell Wilson, president, to fill the vacancy caused by the death of Strickland Kneass.

THOMAS M. GRIFFITHS, civil and mechanical engineer, who built the Minneapolis and Texas suspension bridges, has made his permanent home at Port Richmond, Staten Island.

HENRY VILLARD is president of the Oregon and California Railroad Company, and his resignation as a director of the Northern Pacific Railroad has not been accepted.

F. BROUGHTON, late general manager of the Grand Trunk and Erie road of Canada, has been appointed vice-president and general manager of the Chicago and Alton Railway.

ROBERT W. DOWNING has been elected controller, William Taylor, treasurer, and Charles E. Pugh, general manager of the Camden and Atlantic Railroad Company.

THE treasurer of the Canadian Pacific, W. Sutherland Taylor, was for many years secretary of the Toronto, Grey and Bruce Railway Company.

JOHN MUIR'S connection with the Northern Pacific ceased March 1. He is now general manager of the Oregon Improvement Company.

GENERAL WINSLOW has resigned the presidency of the North River Construction Company.

MISCELLANEOUS.

THE Board of Railroad Commissioners of Kansas, in a decision rendered January 21, 1884, prescribed a system of reduced local freight rates for the entire Atchison system of railroads in Kansas. The board also proposed a system of reduced special freight rates to and from Missouri River points. The board, in their decision, admit the reasonableness of most of the company's former rates, but claims that the earnings of the company are too high and should be reduced $900,000 per year, and that that sum, by a system of reduced rates, be distributed among the people. The railroad company announced on the nineteenth of February, the day on which the rates prescribed by the commission took effect, that, in deference to the commission established by the people, it would adopt, under protest, the entire system of mileage distance rates ordered by the commissioners. On the same day the special rates, which cover the entire State traffic crossing the State, and going to and from the State to other States, were enjoined in a suit brought by the Eastern stockholders of the road in the Court of the Third Judicial District of Kansas. The injunction restrains the

company from adopting these special rates, and restrains the commissioners from endeavoring to enforce the penalty prescribed for failure to adopt the same.

DURING the fiscal year ending July 31, 1883, contracts for the operation of the cars of the Pullman Car Company were concluded with eight additional railroads, including the Chicago, Milwaukee and St. Paul and the Central and Southern Pacific Railway system, covering over 10,000 miles of road. Renewals were made with four important companies, including the Union Pacific and Louisville and Nashville systems, covering over 7,000 miles of road. The number of new cars completed and put in service during the year was sixty-five, costing $930,315.40. The number since August 1, the beginning of the present fiscal year, is thirty-seven, costing $529,100. The number of cars now being constructed for service under contracts recently made is sixty-nine, the cost of which is put at $1,000,000. Stockholders will have the opportunity until March 15 of subscribing for the new stock at par to an extent not exceeding one-tenth of their holdings of record on March 1. A sufficient amount of the present outstanding stock owned by the company will be canceled to leave the increase only twenty per cent. on the old stock after all the stock is issued under the last two calls.

MR. BRITTON, State railroad engineer of Texas, who is the first incumbent of that position, has made a report which must be lively reading. The Austin *News* says of it, that "it condemns in measured language certain corporations; unqualifiedly recommends others. He criticises the condition of each road in detail. He says that claims against the Gould system of railways are held indefinitely at general offices in St. Louis before being audited, while the law requires said officer to be located in Texas. He suggests that the state engineer be empowered to have any trestle work or bridges removed that he may decide upon to be replaced by permanent structures of stone, iron and steel, and says that with four exceptions all the passenger depots in Texas are inadequate in size and unclean, and those at Sherman, Austin, Houston and Beaumont are a disgrace to the roads and an outrage upon the traveling public. They should be abated as a nuisance by the municipal authorities of those respective cities."

W. T. SYLVESTER, of Jacksonville, Florida; N. R. Gruelle, of Gainesville, Florida; George W. Hoagland and H. Judd, of New York; W. F. Reading, of New Jersey; J. W. Sylvester, of Florida, and Will S. Stephenson, of Illinois, have filed articles of association in the office of the secretary of state, Georgia, under the name of The Macon, St. Johns and Gulf Railway Company, for the purpose of building a broad gauge road from Macon to some point in Florida not yet decided upon. The capital stock of the company is placed at $2,000,000, divided into 20,000 shares of $100 each, of which the incorporators each take 100. The estimated length of the road is 250 miles. The route outlined embraces the same counties through which the Macon and Florida Air Line road is having a line surveyed.

OUR contemporary, the *American Machinist*, reports that the Baldwin Locomotive Works have five compound motors for tramways nearly completed. They are built for the government of South Australia. Another small motor, about eight tons weight, of the ordinary locomotive pattern, is nearly completed for an Australian tramway company. There are several heavy ten-wheel locomotives in the erecting shop for South America. These engines have fire-boxes made of heavy copper sheet. At the sides of the fire-box there are hand holes about 2½ inches in diameter through the outer shell, to be used for washing the crown sheet. The engines have extended smoke-boxes, and are in other respects the standard ten-wheel engine of the makers.

GENERAL HUGH H. BAXTER, who died in New York on February 17, became a railroad contractor soon after attaining his majority. His first contract was the construction of the Rutland and Bennington Railroad, and he next went to Ohio and built the Toledo and Wabash. He came to New York and became a large speculator in Wall street. He was a director of the New York Central when Commodore Vanderbilt acquired control of the road, and was the only one of the directors who was retained under the new management. He succeeded Mr. Keep as president of the New York Central Railroad, and was an intimate friend and confidential adviser of Commodore Vanderbilt until the latter's death.

WILLIAM H. VANDERBILT is reported to be the largest individual shareholder in the Chicago, Rock Island and Pacific Railroad. There are thirteen directors in the Rock Island board. The annual election takes place in June. The successors of four directors are to be elected then and of five a year later. A list of the stockholders is demanded, it is thought, to render it possible to secure proxies for the Vanderbilt party, to be used at the ensuing election. While only four directors can be turned out then, it is supposed that, if Mr. Vanderbilt gets control, enough more will resign to give him a majority in the board.

THE government of New South Wales has invited tenders for the supply of 150,000 tons of steel rails, to be manufactured in that colony. Its commissioner of railways says that there were imported into New South Wales and Victoria within the last ten years, 1,250,000 tons of iron and steel. The government of New South Wales has within a few years constructed over 1,200 miles of railroad, and more than 500 miles are now being constructed, all the materials for which (except the sleepers) have been imported from England.

THE Southern Railway and Steamship Association, Washington, has adjusted the difficulties which threatened to break up the association. It has been resolved that the agreement of October 24, 1883, be continued in force until July 1, 1884, with the understanding that the executive committee will have power on June 1 next to continue it until January 1, 1885, by unanimous agreement; but if unable to agree upon so doing, then a meeting of the association on or before July 1 shall be held.

AT the car works of Harlan & Hollingsworth, Wilmington, Delaware, railway cars are being built for use between Madrid and Barcelona, Spain. Other work in hand is building cars for the Argentine Republic, including several "sleepers," and a car for the use of the president of that country. These orders from South America succeed others, already filled, from three railroads on that continent. The shipbuilding department of the works reports great activity.

A NEW system of handling excess baggage has been

adopted by the Chicago and Northwestern and Milwaukee and St. Paul. It went into effect March 1, and is known as the C. O. D. system. It obviates much of the delay heretofore experienced in checking baggage and making cash collections at starting point, and delay (if any) will be transferred to the point of destination of baggage, where there is more time to collect the excess charges.

AN automatic railway signal has been patented by Mr. Theophilus Arndt, of Florin, Pennsylvania. It provides for placing an extra rail at the side of one of the track rails, the extra rail being slightly higher and with sloping ends; there is an attachment to the locomotive, by which a lever is operated in passing over this extra rail, and thus the whistle is blown during the passage over the sloped rail.

A MEETING of the stockholders of the Conotton Valley Railroad Company was held at Boston, February 21, at which a committee was appointed to act in conjunction with a committee of the bondholders, with authority to take such action as shall best secure to the stockholders equitable and legal rights in any reorganization or sale of the railway or its property, or take any action which shall stay proceedings until their rights shall be recognized.

AN exchange reports that the Schnectady Locomotive Works have recently shipped to the Southern Pacific road three passenger engines, weighing forty-five tons each, having cylinders 18x24 inches and drivers seventy-three inches diameter; and to the Chesapeake, Ohio and Southwestern six ten wheel freight engines, with 18x24 inch cylinders, and four eight-wheel freight engines, with 17x24 inch cylinders.

A UNIFORM schedule of train signals will probably be adopted on all the railroads in the country. At the recent Time Convention held in Chicago, resolutions were adopted recommending another convention for the adoption of uniform train signals. Notices have been sent out to the different railroads asking for the appointment of representatives to this convention, the time for which will be named hereafter.

THE Philadelphia *Record* of February 14, said: "The Pennsylvania Railroad Company has about consummated negotiations with the Lehigh Valley Railroad Company for the lease of the latter line to the former. These negotiations have been pending for nearly a year, but were not sooner completed because of the ill-health of the late President Packer, and the inability to reach satisfactory terms."

THE following are announcements of conventions during the coming spring: March 17—Western Association of General Passenger and Ticket Agents, in Cincinnati. March 18—National Association of General Passenger and Ticket Agents, in Cincinnati. April 9—General Time Convention, at Cincinnati. April 16—Southern Railway Time Convention, in New York City. May 20—Railway Car Accountants' Association, in Richmond, Va.

THE Norfolk (Virginia) and Western Railroad Company is building a large transfer boat to ply between its new wharves in Norfolk, and Cherrystone, where connection will be made with the New York and Philadelphia Railroad. The boat will carry eight loaded passenger or freight cars. A transfer will be made and connection completed in a few months.

A CONTRACT has been made between President Robert Harris, of the Northern Pacific, and president W. B. Washburn, of the Minneapolis, Sault Ste, Marie and Atlantic Railway Company, whereby the latter corporation secures a joint use in perpetuity of the extensive terminal facilities of the Northern Pacific Company in Minneapolis, including the iron bridge across the Mississippi.

A WOMAN has been tending a switch at a railroad junction near Macon, Georgia, since 1862, having succeeded her deceased husband, who was switchman for ten years previous. She is at her post from six in the morning till six in the evening, and during the whole long period of her service has never misplaced a switch. She is sixty-two years old.

THE Illinois Southern and Paducah Railway Company was incorporated February 18, with a capital of $1,000,000, to construct a standard gauge road from Carbondale to Metropolis, Illinois, and thence to Paducah, Kentucky, forming a connecting link in the line of the New Orleans, Jackson and Northern Railroad between St. Louis and New Orleans.

NEWS reaches us that the Hydraulic Cement, manufactured by the Lehigh Valley Cement Company, No. 152 Broadway, New York, has been used very extensively during the past ten years in important railroad work, invariably with effective results. A pamphlet containing record of tests, etc., is sent by the above company, on application.

THE Baltimore and Ohio has leased the right of way over the Cleveland, Akron and Columbus Road from the present western terminus of the Pittsburgh, Cleveland and Toledo, at Akron, to the point where it intersects the Wheeling and Lake Erie, which gives them a short and direct line into Toledo.

THE Illinois Central Railroad has withdrawn its offer of $800,000 for the three blocks of land on the lake front, Chicago, on which it was proposed to erect a union station for itself, the Michigan Central, and the Baltimore and Ohio. The offer still holds good as to the Michigan Central.

A TRAFFIC agreement has been made between the Louisville, New Albany and Chicago Railroad and the Cincinnati, Indianapolis, St. Louis and Chicago Road. The agreement is based on an equal division of the carrying trade between the two large cities on the lines of the two roads.

THE following have been appointed by the mayor of Baltimore, directors on the part of the city in the Baltimore and Ohio Railroad Company: B. F. Ulman, Edward L. Bartlett, Samuel E. Atkinson, Robert Ober, Michael Coakley and Jacob H. Hook.

AT the half-yearly meeting of the North Metropolitan Tramway companies, London, the chairman said that they were now building their own cars at a cost of £140 per car, compared with £190 previously paid for English, and a great deal more for American cars.

ON the Cumberland Valley Railway, Pennsylvania, there is a car specially fitted with dynamos and stationary steam-motor, lamps, etc., to supply the electric light to any part of the line it may be wanted at in case of a collision, or for night work on the track.

THE corporate existence of the New York and Boston

Inland Railroad Company in Connecticut, has expired by the statutes of the State, the company having failed to expend ten per cent. of its subscribed capital in construction before February 4, as required.

THE Atchison, Topeka and Santa Fé Railroad Company has issued a circular announcing that it will transport through California, freight in connection with the Southern Pacific from Kansas City, Atchison or Denver, without breaking bulk.

A CHARTER has been granted to the Meadville and Lineville Railway, of Crawford County, Pennsylvania, capital $200,000. The line is an old one, twenty-one miles in length, and was recently bought in at sheriff's sale.

THE Pittsburgh, Buffalo and Rochester and Brandy Camp Railroad Companies have consolidated, with a capital stock of $3,000,000. The new road is to be known as the Pittsburg and Buffalo Railroad Company.

THE report published in a morning newspaper that an enlargement of the Grand Central depot was contemplated by the New York Central Railroad Company is denied by President Rutter.

AN exchange reports that Tacoma, Wyoming Territory, rejoices over the fall of Villard. Real estate is going up, and investors are flocking in, now that the western terminus of the Northern Pacific is fixed at that point.

THE Gilbert Car Company, Troy, New York, has now in hand contracts for 300 freight cars to go to Chili, ten passenger cars for Brazil, and several passenger cars for Nicaragua.

THERE is a rumor that the Pennsylvania Railroad, as well as the Grand Trunk, is looking toward the lease of the West Shore Railroad.

EIGHT hundred freight cars for the Union Pacific road are in course of construction at the Peninsular Car Works, Detroit.

THE man who buys the wood burned by the Maine Central Railroad says that in Maine wood is growing faster than it is cut.

BOTH of the mills at Swift's Iron and Steel works, Cincinnati, are being run double time in all departments.

IRON cars for copper mines in Virginia, are being built by the Youngstown Car Manufacturing Company.

WITHIN the next two months the double track of the West Chester Road will be completed to Media.

THE district railway trains between Kensington and Putney (England) are lighted by electricity.

GOVERNOR LOWRY, Mississippi, vetoed the Railroad Commission bill. His veto was sustained.

SINCE March 1 the New England Railroad has declined to carry through freight for the Erie.

ELECTRIC lighting of trains has been introduced on the Vienna and Trieste Railroad.

THE Pittsburgh and Western Railroad has been sold to the Baltimore and Ohio.

IN Australia, the gauge of five feet and three inches has been adopted.

THE Michigan Car Company, Detroit, report great activity.

MEXICAN NOTES.

Adapted from the Mexican Financier.

IT is understood that the time between the city of Mexico and New York or Boston will be six days on the completion of the Mexican Central, while the time to San Francisco will be four days. From Mexico to the boundary at El Paso will be about two days, the distance being 1,224 miles. From El Paso to San Francisco there will be a choice of two routes, the Atchison, Topeka and Santa Fé, up the Rio Grande valley to Albuquerque and thence to California by the Atlantic and Pacific, and from El Paso to New Orleans there will also be a choice of two routes, either by the Texas and Pacific or Southern Pacific. The Texas and Pacific line will also communicate with the East by way of St. Louis. The most intimate connection of the Mexican Central for the East will be by the allied line of the Atchison, Topeka and Santa Fé, through New Mexico and Kansas to the Missouri River at Kansas City, and thence by the "Great Burlington Route," or Hannibal and St. Joseph and Chicago, Burlington and Quincy railroads.

THE people of the State of Michoacan, one of the richest in natural resources in the Republic, will soon have reason to rejoice in the building of the Mexican National Railway in their midst. Adopting the true policy, the company finds it for its own profit to meet the public in a liberal spirit, encouraging trade by adopting low rates of freights and fares, and seizing every opportunity for attracting business and building up industries along its line, instead of squeezing from its traffic the utmost immediate returns possible, and thus repressing every tendency to enterprise and development in the country tributary to it.

THE Mexican Indian laborers have excellent points. They are docile, frugal, industrious, obedient and uncomplaining. The builders of the railways testify to their superiority as workmen. The railways are affording them opportunity for better employment at better wages; and with better wages their wants increase, giving them new value as a consuming as well as a producing class. Ambition is born of opportunity, and instances are multiplying of their rising from the ranks of common laborers to positions of responsibility, from foremen of track-laying gangs upwards.

THE importance laid upon the study of English in this republic is shown by the fact that over 300 students of the University, or National Preparatory School, have inscribed themselves for that course. According to statistics received by the Secretary of Public Instruction, something like 5,000 persons in this country are at present studying English.

IT is proposed to introduce the cable tramway system, so successful in San Francisco and Chicago, upon the street railways of Mexican cities, a company having been organized in San Francisco for the purpose, under the name of the Mexican Cable Tramways Company.

THE Mexican Central Railway Company, has announced by circular that regular trains will be running on its line between the first and fifteenth of April. Driving the last spike was an epoch in Mexican history.

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NEW YORK, MARCH, 1884.

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TO READERS AND ADVERTISERS.

THERE is no necessity why we should "blow our own horn," because the merits of our publication speak for themselves, and directing the attention of subscribers and advertisers to some features of the present conduct of this magazine, which we regard as important from their standpoint, does not lay us open to the charge of doing this.

Published but once a month, the "layout" of the AMERICAN RAILROAD JOURNAL must necessarily differ from that of periodicals which appear at shorter intervals. The month's news in a condensed form, with articles of due length containing the more prominent record of leading events during the period are, of course, indispensable; but details which appear in daily and weekly papers, and are only of importance when published at their proper time, are wisely made to give place to articles of permanent value. Readers are confidently referred to these columns for proof that this obviously judicious preference is properly recognized by us; and advertisers are respectfully reminded that their interest is well served by the presence in the reading columns of the journal enjoying their patronage, of contributions giving it a value which insures its being placed on file by subscribers. Their announcements are thereby made as permanent as that of the contents of the magazine in which they appear, an advantage upon the value of which we need not insist.

In the department of "Communications," moreover, the same attribute of special value is to be remarked. Representing many pens and various interests, this department is of considerable and growing importance; and its widely representative character, comprehending the charm of differing style and ideas, is pleasing as well as instructive to the reader, and assures, besides, that quality of widespread and long-lived interest which is most advantageous to advertisers.

All that we have said is, moreover, true of that part of the JOURNAL in which new railroad inventions are described and illustrated. This, we venture to state in addition, is invaluable to the practical railroad man, whatever may be his department of activity. The record of mechanical improvement is fertile in suggestion, the use of which infringes no patent and conduces to the general good. That every issue of this periodical gives the latest results of mechanical ingenuity as applied to railroads, the product of thoughtful minds and skillful hands in this and other countries, is an element of its strength and usefulness, which we regard with the satisfaction shared by readers universally.

From its commencement, the department "Tramway" has been read eagerly, and the experiment of its institution approved, as a unique and valuable feature of this publication. All the important news and articles of per-

manent interest appear in every issue under the head quoted, one which, by the way, is employed as the proper expression, in all English-speaking countries; and, seeing that the JOURNAL has many readers in Great Britain, the English colonies, and many other foreign lands, is preferred to the name more generally used in this country alone.

A word to manufacturers desirous of finding the best means of making their announcements known to railroad and tramway companies, will fitly end these modest words about ourselves. The staunch persistency with which many of these patronize the JOURNAL, in some cases throughout many years, is the best evidence that they appreciate its value as an advertising medium. They always find their announcements in good company, handsomely printed in a paper every page of which is artistic in appearance; they know that they are fairly dealt with, uniform rates being charged; that they are not in the company of "deadheads" printed to make a great show of business, and that what they have to say is part and parcel of the valuable railroad and tramway information periodically given to all the leading companies and manufacturers, and to a large constituency of wide-awake readers outside of these but attached to kindred industries, in every civilized country, by "the oldest railroad paper in the world."

BUSINESS MEN AND POLITICS.

THE very spirited letter which "Pontifex" contributes to our columns is virtually an accusation. Its main incident is an instance of corruption, showing how popular rights, in the matter cited, were not only at the mercy of petty local politicians, but abused by these pestilential parasites. We cannot but feel convinced that the facts recorded are examples of what is general in this country, and share the shame which all true patriots and all just men must feel in reading such a recital.

Every good citizen is, as a matter of course, interested in and anxious for good government, wisely and purely administered, in the municipality, the State, and the Union. The body politic should be like a vigorous tree, nourished with healthy sap circulating in its every part, from giant stem to the tiniest twig and leaf, giving combined symmetry and strength, beauty and majesty.

In various ways, by speech, newspaper article, and the more ambitious agency of magazine literature, the doctrine is being iterated and reiterated, that the cure for evils corrupting and deforming our political structure, is in the hands of the people, whose industry and virtue save the Union from political decay, notwithstanding the influences which disgrace it and retard its development. Happily there are present indications that the lesson falls upon ears willing to learn and act upon it. The beginning of this year of political contest is characterized by movements giving the promise that enlightened and virtuous citizens are awake to the duty of themselves deciding who shall administer for them, and on what principles administration shall be effected.

No class of men is more interested in good government than business people. Abuses wrought by corruption, stupidity, narrow-minded and partial legislation prejudice their welfare vitally, whether by direct or indirect means. The steady development of industrial progress is the best evidence of a nation's possession of the strength and graces which ennoble it; and the possession of these finds its proper expression in the material progress possible only to a virtuous and manly people. Surely, therefore, the representatives of great material and commercial interests to whom these words are respectfully addressed, have abundant occasion to see to it that they have their just share in shaping the political administration of their particular locality, their State, and the nation; and the hope is reasonable, and, as we have suggested, well-grounded that, in the coming political events of this year and in the future, they will be found alive to the performance of their duty in determining who shall hold office, and what shall be the nature of coming legislation.

AN advertisement pays when it pays both advertiser and publisher. It is indispensable to successful business that both parties profit by transactions effected. An interesting commentary on this principle of trade is afforded in the fact that a considerable proportion of the advertisements which appear in this journal, have been standing many years.

VOLUME 57 of the AMERICAN RAILROAD JOURNAL is completed with this issue. The April number will contain an index covering the principal contents of the volume now concluded.

A CORRESPONDENT of a Western paper says: "We sorely need some restraining influence upon irresponsible interference in railroad management. I use the words irresponsible and management advisedly, the first because those who administer the laws are responsible to no living authority for the consequence of their acts, and the owners of railroad property who suffer these consequences are absolutely without redress for their mistake, whether these errors are the result of ignorance or ill will, and because those things the doing of which constitutes the very essence of management, are transferred from those appointed by the owners to those appointed by the State."

AFTER reviewing the speed attained by the fastest trains in England, our old friend Herapath observes with patriotic complacency: "On the whole we may feel proud of our English lines. How favorable is the contrast with the twenty miles per hour pace on the Continent and the scarcely more expeditious average time on American lines."

Railroads in Massachusetts.

THE Fifteenth Annual Report of the Board of Railroad Commissioners, Massachusetts, just received, states that the total length of railroads belonging to the corporations making returns, considering double track and sidings as additional single track, and omitting fractions, is 4,718 miles, an increase during the year of 142 miles. Of this total length 3,340 miles are in Massachusetts, an increase of eighty-three miles for the year. The average cost of a standard gauge road, with equipment, is $67,100. Narrow-gauge roads cost $29,634.00 per mile, and $6,853.09 additional per mile for equipment. The number of corporations making returns is sixty-five, a net decrease of two. The New York and Boston Inland has been added to the list, and the Lee and Hudson and Olean Terminal have been dropped, their charters having expired. The Middlesex Central has been consolidated with the Boston and Lowell.

The aggregate capital stock, September 30, 1883, was $122,367,572.27, a decrease of $608,689.99, resulting from the decrease of $3,073,100.00 from the consolidation of the Boston, Clinton, Fitchburg and New Bedford with the Old Colony; a decrease of the Middlesex Central of $280,000.00, the road being purchased by the Boston and Lowell, and a decrease in the Lowell and Framingham of $4,600.00, and also from the expiration of the charters of the Lee and Hudson with $235,284.99, and the Ocean Terminal with $2,000.00 of capital stock. On the other hand, there has been an increase of the Old Colony of $2,714,820.00, the Milford and Woonsocket of $17,475.00, the Milford, Franklin and Providence of $70,000.00, the Providence, Webster and Springfield of $30,000.00, and the Boston, Revere Beach and Lynn of $97,000.00. The New York and Boston Inland has obtained a charter with a paid-up capital stock of $500,000.00.

The net debt of the companies—the gross debt less cash assets—amounts to $72,933,200.93, an increase of $1,019,484.93. On the other hand, the cash assets of all the railroad companies of the State have increased to the amount of $965,305.01.

The total gross income for the year is $43,380,387.63, an increase of $2,534,017.53, or 6.2 per cent.

The total expenses—including rents paid—of all the corporations amounted to $32,479,907.71, an increase of $2,535,740.56. The net income was $10,900,479.92, being a decrease of $1,726.03. The passenger earnings were $20,602,280.13, an increase of $1,035,014.42 over the year 1882, when they amounted to $19,567,274.71. The freight earnings were $21,033,511.26, an increase of $1,506,416.72, or nearly eight per cent. over those of last year, which amounted to $19,527,094.54.

The local passenger earnings were $13,652,320.69, an increase of $972,686.18 over the figures of last year, which were $12,679,634.51. The through passenger earnings were $5,245.265.19, an increase of $82,943.77 over the amount for last year, which was $5,162,321.42. The express, mail, and other earnings included in total passenger earnings, as given above, amounted to $1,704,703.25, being a decrease of $20,615.53, this item having been, in 1882, $1,725,318.78. The local freight earnings were $10,861,206.85; in 1882 they were $9,955,675.74, showing an increase of $905,531.11. Through freight was $10,104,560.63, against $9,408,552.43, an increase of $696,008.20.

The income from all other sources of the freight department amounted to $67,743.78, as against $162,866.37, a decrease of $95,122.59.

The increase of passenger mileage—or passengers carried one mile—for the year amounts to 50,925,451. The increase of freight mileage, or tons of freight carried one mile, amounts to 90,753,766. The total number of passengers carried was 61,530,747, showing an increase of 5,662,053 over the previous year. The whole number of tons of freight carried was 20,202,881, as against 19,061,164; showing an increase of 1,141,717 tons.

The average sum earned on each mile of main track and branch operated was $12,946.46; or, computing double track as additional single track, the average per mile was $10,055.88. The average earnings per mile, on the eight roads of standard gauge terminating in Boston, was $13,258.60, being an increase of $630.18 per mile.

The net income of 1882–83 was earned by the several corporations in the following proportions as compared with their permanent investments:

17 companies with	$ 9,912,000	permanent investment	had	no net income.	
14 "	" 39,497,000	"	"	3½ per ct. or less.	
13 "	" 14,868,000	"	"	3½ to 5½ per ct.	
10 "	" 71,953,000	"	"	5½ to 7½ "	
5 "	" 27 688,000	"	"	7½ to 9½ "	
5 "	" 34 982,000	"	"	9½ to 12½ "	
64 companies, Troy & Greenfield not included.....	$198,899,000	"	"	net income, rents not deducted, of 6.4 per cent.	

The total amount of dividends paid was $6,379,721.10, an increase of $108,581.24 over last year. Of the sixty-three corporations, thirty-four paid dividends varying from two to ten per cent.

The average cost of running trains one mile during this year on all roads reported, has been $9.949.

During the year, 308,228 miles of steel rail were laid, as against 331,239 laid last year, making the whole amount now laid 2,774.431 miles: being nearly seventy-seven per cent. of the total of main line, including double track.

The increase in the number of locomotives during the year has been sixty-four, and of passenger cars, 132; mail and baggage cars have increased nineteen; freight and miscellaneous cars have increased 1,626.

The average number of persons employed by the railroad corporations was 29,844, being 2,441 more than in the year before. The whole number employed by all the corporations making returns to the Board, 33,385.

Railroad accidents in Massachusetts during the railroad year, resulted in injured persons 524, being 110 more than the number for the year ending September 30, 1882. Of these, sixty-four were passengers, the number last year being twenty-seven. The number of persons killed was 191 against 163 for last year. Of this number, fifteen were passengers, fourteen of whom died as the result of accidents caused by their own misconduct or negligence. One was killed without such negligence while riding as a favor on a freight train in violation of rule, but in accordance with a practice known to the managers of the road. It may, therefore, be said, that no passenger riding in a passenger train has been killed during the year except from his own fault. The number of employés injured, not fatally, was 203; the number killed was sixty-two. The number of trespassers killed during the year was ninety-three; the number injured, not fatally, fifty-four. Of the whole number, 112 were unlawfully on the track, and thirty-three were unlawfully in the cars. Only three are reported as suicides.

The number injured at highway crossings was twenty-nine; the number killed was fifteen. Of the whole number, forty-four, the number injured or killed at crossings with gates or flagmen was eighteen. The number at crossings not so guarded was twenty-six. Among the train accidents, nine were rear collisions, resulting in four injuries and one death. Ten were butting collisions, resulting in nine deaths and thirty-six injuries. In all, there were nineteen collisions with ten fatal injuries and forty not fatal. Twenty-five derailments occurred, killing one person and injuring fourteen. Collisions with vehicles at crossings numbered twenty-two, resulting in two fatal injuries to persons and nineteen not fatal.

The amount of damages for personal injuries paid this year by the eight roads of standard gauge terminating in Boston, is $138,580.33.

Report of the Railroad Commissioners of Iowa.

We are indebted to the railroad commissioners of Iowa for a copy of their sixth annual report, for the year ending June 30, 1883. Appended are the chief facts contained in said report, showing the condition of the railroad interest in the State named.

The total number of miles of railroad in operation in Iowa is 7,015; 5,876 owned by the companies operating them, and the balance leased. Only forty-seven miles of double track. The report of the capital stock and debt is based on the entire lines of the roads which run into other States. The entire mileage of these roads is 26,685. The companies estimate that the stock of these roads representing the portion of them in Iowa, added to the stock of the roads entirely in Iowa, amounts, broad gauge roads, to $132,895,478.00, or $19,811.00 per mile; the narrow gauge roads, to $1,386,991.00, or $6,481.00 per mile. Stockholders in the State, 671, holding $5,164,591.41. Narrow gauge roads owned by the Chicago, Milwaukee and St. Paul road are estimated with the broad gauge lines. Total debt of the roads, broad gauge, $126,456,879.00, $18,863.00 per mile; of this $120,534,557.00 is funded and $5,932,322.00 unfunded; narrow gauge, $1,345,000.00, or $6,170.00 per mile; of this $1,333,000.00 is funded debt, and $12,000.00 unfunded. Amount of stock and debt, $262,094,348.00, or $37,864.00 per mile. Increased mileage for the year, 2,134; increased indebtedness, $33,079,210.11; deducting the decreased indebtedness, the net increase is shown to be $29,773,762.46, representing both new mileage and lines purchased. The estimated cost of roads in Iowa is $246,495,001.77.

Total earnings for the year ending June 30, 1883, were $34,433,354.77, an increase over previous year of $2,409,388.74; operating expenses for the year, $22,827,450.50, leaving the net earnings $11,605,904.27.

The property accounts of the roads have increased during the year $38,168,299.50; properly belonging to the roads in Iowa, $17,811,305.50. Taxes paid by the railroads in the State, $830,655.67, or 7 16-100 per cent. of the net earnings.

Fifty per cent. of the entire roads in the State, exclusive of sidings, is steel rail; only twenty-two per cent. in 1878.

Seventy-nine per cent. of the freight of the Iowa roads is inter-State in its character.

Total number of locomotives, 3,104; cars, 98,106, of which 1,244 are passenger cars, 713 baggage, mail, and express cars, 118 parlor, sleeping and dining cars, 57,771 box freight cars, 12,074 stock cars, 18,599 platform and coal cars, and 7,587 other cars. The speed of passenger trains varies from twenty to twenty-six miles per hour; that of freight trains from ten to sixteen. The average rate of freight charges of all the roads reporting is 1 24-100 cents per ton per mile.

The total number of persons employed regularly in operating the roads of the State is 27,112; amount paid for their services in the year, $13,164,288.07, or $1558,383.80 more than the earnings of the roads above operating expenses and taxes; or "in other words," add the commissioners, "the entire capital stock and debt realize this much less from the property than the labor alone in operating it. This might be a subject well worth the attention of the economist."

During the year 151 persons were killed, of whom four were passengers, eighty-two employés, and sixty-five others in no way connected with the roads in its operations or movements. Persons injured during the year, 330. Killed, fourteen fewer than the previous year; injured, 305 fewer.

The net amount realized by the railroad companies from land grants by Congress is given at $11,444,478.94.

St Louis, Vandalia and Terre Haute.

The annual meeting of the stockholders of the St. Louis, Vandalia and Terre Haute Railroad Company, was held on the second Tuesday in January, at the office of the company, Greenville, Illinois. Joshua S. Peers was made chairman, and Williamson Plant, secretary. Having accepted the president's report for the fiscal year ending October 31, 1883, the meeting elected the following gentlemen directors: Thomas D. Messler, J. N. McCullough, William Thaw, W. R. McKeen, Robert L. Dulaney, Abraham McNeill, A. G. Henry, Charles H. Seybt, and J. S. Peers.

The president's report of the operation of the road by the lessee during the year, and the financial condition of the company October 31, 1883, showed gross earnings, $1,700,954.06, an increase of $104,828.59 over the earnings of the previous year. Expenses for the year were $1,306,067.12, an increase of $118,507.05 over those of the previous year. The total miles of track owned by the company, and in use at the close of October 31, 1883, was 200 $\frac{3}{100}$ miles. During the year 34 $\frac{23}{100}$ miles of track were relaid with steel rails, and 38 $\frac{73}{100}$ miles ballasted, leaving but six miles of the main track to ballast. No change has been made in the capital stock, funded debt, or other liabilities, excepting a slight decrease in the amount of coupons for interest not presented for payment. The cost of the company's property was increased by purchases of real estate and payment for right of way, to the amount of $228.25. The balance due by the lessee was increased from $215,530.76, October 31, 1882, to $342,076.08, October 31, 1883. From this there was payable at November 1, 1883, $91,000.00 for interest on the second mortgage bonds, leaving a net balance of $251,076.08, besides the balance in the hands of the treasurer, of $3,144.77. The officers for 1884 are: President, Thomas D. Messler; treasurer, John E. Davidson; secretary, Williamson Plant.

Report of the Illinois Central.

THE report of the directors to the shareholders of the Illinois Central Railroad Company for the year ending December 31, 1883, states that the gross sum received from the traffic of the entire line of 1,928 miles during the past year was $13,064,743.39. This is an increase of $403,035.31 over the gross earnings of 1882. The net receipts from all sources last year were $5,764,391.95. From this fund were paid $538,750 interest on debt, $50,000 in bonds drawn under sinking fund, $1,486,203.50 for the rental of the Chicago, St. Louis and New Orleans Railroad, and $632,529.66 in permanent expenditures in Illinois and on the Southern Division. A balance of $3,056,908.76 remained, out of which the regular dividend of 4 per cent. and an extra dividend of 2 per cent. will be paid. A surplus of $156,908.79 will be carried to the surplus dividend fund.

Work has advanced on the various extensions of the road during the past year. It is expected that the Canton, Aberdeen and Nashville Railroad will be opened for traffic in May next, and the Yazoo and Mississippi Railroad some time in March. The further outlay necessary to complete these roads is estimated at $325,000. The directors believe that these roads will not only pay a fair return upon the capital invested, but will also prove valuable feeders to the main trunk of the Southern Division. The outlays during 1883 on capital account, not provided from the income, were as follows: Middle Division, $77,503.43; South Chicago Railroad, $63,296.87; Canton, Aberdeen and Nashville Railroad, $1,463,313.83; Yazoo and Mississippi Valley Railroad, $575,709.36; Iowa Division, $80,487.10; total, $2,260,310.59.

Lehigh Coal and Navigation Company.

THE report of this company, submitted at the annual meeting of the stockholders, held February 26, states that the total revenue for the year was $2,194,489, and the disbursements $1,249,845, leaving net earnings of $944,644, from which, after making sinking fund charges, accounting for depreciation on coal improvements, and paying two dividends, there was a balance carried to the credit of the dividend fund of $130,476. The coal tonnage of the Lehigh and Susquehanna Railroad and the Lehigh Canal for the year was 5,152,218, being an increase, as compared with 1882, of 486,367 tons. The canal traffic shows an increase over the previous year of 61,357 tons.

After referring to the agreement with the Philadelphia and Reading Railroad Company, under its lease of the Central of New Jersey, the report says: "While we have thus protected our interests, we feel that the Philadelphia and Reading Railroad Company will have great advantages in the possession and use of our railroads, which enable them to handle the great growing traffic between New York and Central and Northwestern Pennsylvania more cheaply than they could over their own longer lines, and as all our relations with them since the lease have been harmonious, we have no doubt that it will largely conduce to the best interests of both parties. The transportation of the tonnage of the Alliance Coal Company has been permanently secured to the Lehigh and Susquehanna Railroad Company, and the business from this source is expected shortly to amount to 300,000 tons annually."

The Stewart Bill to Regulate Inter-State Commerce.

A CORRESPONDENT of the New York *Times* writes that the bill to "regulate inter-State commerce and establish a Railroad Commission" introduced in the House of Representatives at Washington by Mr. Stewart, of Vermont, is a measure of no ordinary importance. It is the first step in the way of conciliation and mutuality between the railroads and the public. It reflects the opinions of a very large majority of the Committee on Commerce and of members of both houses who have studied the subject, and of some of the most experienced railroad managers in the country.

The first section of Mr. Stewart's bill defines the words "inter-State commerce," "railroad company," "traffic," and "rebate." Three sections follow which define and are intended to secure reasonable rates, and to prohibit undue or unjust preferences, discriminations, advantages, or prejudices in favor of or against any person, place, or traffic; to secure uniformity of rates to all persons under like conditions, and to prohibit all combinations to maintain unreasonable rates, to prevent competition, and to injure inter-State commerce. The remaining nine sections establish a commission of three persons, of whom one shall be experienced in the law and one in railroad business. This commission is charged with the duty of securing obedience to the act. Any citizen may present his petition charging that any railroad company has violated the act. The commission may exercise its discretion except when the petition is presented by a commercial body, or when it is approved by a district attorney of the United States, in which cases the commission must take proceedings. The first step is to notify the company charged of the contents of the petition, so as to give it an opportunity of taking satisfactory action. If it fails to do so, it is required to answer the petition in writing, after which the commission, by its own examination or through a referee, proceeds to ascertain the facts and make report in respect to the alleged violation. If the act has been violated, the company is to be notified to cease such violation. If it does not within six days, the commission transmits a copy of its report and findings to the Circuit Court of the United States for the proper district, which court is to be at all times open for these proceedings. It is made the duty of the district attorney to apply for an injunction to arrest the violation. The court is to proceed summarily to ascertain whether the violation exists, and if it does exist an injunction and other remedial process may be issued to restrain the company violating the act. Any person injured may appear in person or by attorney. The court may award costs in its discretion, and if the violation is found to be willful or to have been committed after notice by the commission, the court may award a sum for costs large enough to reimburse the petitioner for all his costs, charges and expenses. Any person injured may bring a private action in the proper Federal court, and may, in the discretion of the court, recover treble damages and full costs. The commission must annually report to Congress all its proceedings, with recommendations concerning legislation. The bill is in great part taken from the statutes of Great Britain. The commission is not, like the English commission, given judicial powers, such powers being prohibited by the Constitution. The commission may compel the production of all books and

papers and the attendance of witnesses, and is given full and complete powers of visitation over all companies engaged in inter-State commerce.

New English Railway Patents.

THREE tunnels are so combined that any one can be employed to supply air near the center by a forced ventilation to the other two, which are each for a single line of rails. Latch locks for railway carriage doors, etc., are constructed with springs so applied as to retain the latch in either the locked or unlocked position, and with two inclines upon the striking plate, one to raise and the other to press the latch downwards. The plunger and its collar of railway buffers are so fitted that the collar can be adjusted and fixed on the plunger to retain the same in the box or case, and can be readily removed to allow of the withdrawal of the plunger. A spring or elastic body is arranged between the collar and the bushing or thickened end of the box or case, to check the recoil of the plunger. An apparatus for electric lighting on railway trains, etc., has generators driven by the motion of the train, and made to charge accumulators from which the electric lamps are supplied, and the object of the invention is to effect the automatic reversal of the commutator brushes on the reversal of the motion of the generator; the commutator brushes are arranged in two pairs carried by swing frames, one pair only being in contact with the commutator at any moment.

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BY WILLIAM S. HUNTINGTON.

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Report of the Illinois Central.

THE report of the directors to the shareholders of the Illinois Central Railroad Company for the year ending December 31, 1883, states that the gross sum received from the traffic of the entire line of 1,928 miles during the past year was $13,064,743.39. This is an increase of $403,035.31 over the gross earnings of 1882. The net receipts from all sources last year were $5,764,391.95. From this fund were paid $538,750 interest on debt, $50,000 in bonds drawn under sinking fund, $1,486,203.50 for the rental of the Chicago, St. Louis and New Orleans Railroad, and $632,529.66 in permanent expenditures in Illinois and on the Southern Division. A balance of $3,056,908.76 remained, out of which the regular dividend of 4 per cent. and an extra dividend of 2 per cent. will be paid. A surplus of $156,908.79 will be carried to the surplus dividend fund.

Work has advanced on the various extensions of the road during the past year. It is expected that the Canton, Aberdeen and Nashville Railroad will be opened for traffic in May next, and the Yazoo and Mississippi Railroad some time in March. The further outlay necessary to complete these roads is estimated at $325,000. The directors believe that these roads will not only pay a fair return upon the capital invested, but will also prove valuable feeders to the main trunk of the Southern Division. The outlays during 1883 on capital account, not provided from the income, were as follows: Middle Division, $77,503.43; South Chicago Railroad, $63,296.87; Canton, Aberdeen and Nashville Railroad, $1,463,313.83; Yazoo and Mississippi Valley Railroad, $575,709.36; Iowa Division, $80,487.10; total, $2,260,310.59.

Lehigh Coal and Navigation Company.

THE report of this company, submitted at the annual meeting of the stockholders, held February 26, states that the total revenue for the year was $2,194,489, and the disbursements $1,249,845, leaving net earnings of $944,644, from which, after making sinking fund charges, accounting for depreciation on coal improvements, and paying two dividends, there was a balance carried to the credit of the dividend fund of $130,476. The coal tonnage of the Lehigh and Susquehanna Railroad and the Lehigh Canal for the year was 5,152,218, being an increase, as compared with 1882, of 486,367 tons. The canal traffic shows an increase over the previous year of 61,357 tons.

After referring to the agreement with the Philadelphia and Reading Railroad Company, under its lease of the Central of New Jersey, the report says: "While we have thus protected our interests, we feel that the Philadelphia and Reading Railroad Company will have great advantages in the possession and use of our railroads, which enable them to handle the great growing traffic between New York and Central and Northwestern Pennsylvania more cheaply than they could over their own longer lines, and as all our relations with them since the lease have been harmonious, we have no doubt that it will largely conduce to the best interests of both parties. The transportation of the tonnage of the Alliance Coal Company has been permanently secured to the Lehigh and Susquehanna Railroad Company, and the business from this source is expected shortly to amount to 300,000 tons annually."

The Stewart Bill to Regulate Inter-State Commerce.

A CORRESPONDENT of the New York *Times* writes that the bill to "regulate inter-State commerce and establish a Railroad Commission" introduced in the House of Representatives at Washington by Mr. Stewart, of Vermont, is a measure of no ordinary importance. It is the first step in the way of conciliation and mutuality between the railroads and the public. It reflects the opinions of a very large majority of the Committee on Commerce and of members of both houses who have studied the subject, and of some of the most experienced railroad managers in the country.

The first section of Mr. Stewart's bill defines the words "inter-State commerce," "railroad company," "traffic," and "rebate." Three sections follow which define and are intended to secure reasonable rates, and to prohibit undue or unjust preferences, discriminations, advantages, or prejudices in favor of or against any person, place, or traffic; to secure uniformity of rates to all persons under like conditions, and to prohibit all combinations to maintain unreasonable rates, to prevent competition, and to injure inter-State commerce. The remaining nine sections establish a commission of three persons, of whom one shall be experienced in the law and one in railroad business. This commission is charged with the duty of securing obedience to the act. Any citizen may present his petition charging that any railroad company has violated the act. The commission may exercise its discretion except when the petition is presented by a commercial body, or when it is approved by a district attorney of the United States, in which cases the commission must take proceedings. The first step is to notify the company charged of the contents of the petition, so as to give it an opportunity of taking satisfactory action. If it fails to do so, it is required to answer the petition in writing, after which the commission, by its own examination or through a referee, proceeds to ascertain the facts and make report in respect to the alleged violation. If the act has been violated, the company is to be notified to cease such violation. If it does not within six days, the commission transmits a copy of its report and findings to the Circuit Court of the United States for the proper district, which court is to be at all times open for these proceedings. It is made the duty of the district attorney to apply for an injunction to arrest the violation. The court is to proceed summarily to ascertain whether the violation exists, and if it does exist an injunction and other remedial process may be issued to restrain the company violating the act. Any person injured may appear in person or by attorney. The court may award costs in its discretion, and if the violation is found to be willful or to have been committed after notice by the commission, the court may award a sum for costs large enough to reimburse the petitioner for all his costs, charges and expenses. Any person injured may bring a private action in the proper Federal court, and may, in the discretion of the court, recover treble damages and full costs. The commission must annually report to Congress all its proceedings, with recommendations concerning legislation. The bill is in great part taken from the statutes of Great Britain. The commission is not, like the English commission, given judicial powers, such powers being prohibited by the Constitution. The commission may compel the production of all books and

papers and the attendance of witnesses, and is given full and complete powers of visitation over all companies engaged in inter-State commerce.

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whole arrangement is the very essence of imperfection. But it is far easier to discover a fault (in this case) than to provide or even suggest a remedy.

Have you ever witnessed a crowd of people on the streets at midnight, called out by an alarm of fire? And did you notice that everyone was dressed in a rather loose sort of manner; everything in a slipshod, down at the heel, unstrung, unlaced, unbuttoned condition, everything loose and "shackley?" Well, an hour's walk on many of our average tracks would remind one of such a crowd of people. For miles you would not see a single joint in a perfect condition; not a splice bar giving support to the rails. And yet thousands of miles of tracks are being laid every year with those (so-called) joint fastenings.

Recent investigations have shown unmistakably that the soft rails are the most durable so far as wear is concerned, and a return to soft rails will most assuredly prevent accidents from broken rails. Steel rails are now in use that are no better than cast-iron, and the sooner they are re-rolled and improved the better. With a return to soft rails we may reasonably expect a radical change in the style of joint support and, doubtless, some sort of chair will take the place of the abominable fish-bar now so common. It is not expected that the old "anvil chairs" will ever again come into use, but it is tolerably certain that some modification of that old-time fixture will supersede the fish-bar. A half-inch wrought plate chair resting on a broad joint tie on good ballast is far superior to the poorer class of fish-bar joints, but the coming joint will, in all probability, consist of a steel chair or rather "grip," clasping the ends of the rails and suspended between two ties. More than twenty-five years ago the writer used heavy cast chairs with strong lips on both sides, which fitted the rails snugly. These chairs were used on bridges in New England and were placed between two ties. The rails on these bridges wore evenly, the ends keeping of the same form as other portions of the rails. No matter how little elasticity there is in a track, there is always a slight depression of the rail in advance of the wheel, and no joint fastening is perfect unless the next rail is depressed exactly as much as the one on which the wheel rests before reaching that next rail, as was the case on the bridges referred to. Perhaps when we get back to soft rails and steel clasp chairs (not anvils) the wear and tear and breakages will be greatly diminished. Another matter in this connection which needs looking after is to get a standard rail section. This we can get by going back a quarter of a century. Then we had rails the heads of which were flat on the top and beveled inwardly so as to conform to the cone of the wheels of rolling stock. This gave a bearing for the wheel treads the entire width of the rail head. The advantages of this over the system Mr. Halley speaks of as making the "foot prints" of the wheels only three-quarters of an inch wide is too obvious to require mention here. But it is really a matter of wonder that such malpractice should be continued in this progressive age. It is time to do away with some of this nonsense, and either make cylindrical wheels and level, flat-topped rails, or make beveled-headed rails to conform to conical wheels; or, preferably, to make the rail head flat and parallel to its base in its cross sections. Then, in laying the rails, adze the ties so as to incline the rails inwardly, sufficient to bring the entire head in contact with conical wheel treads. This would not only protect the rails from rapid destruction by virtue of an equal distribution of wearing surface, but the wheels as well.

A year or two ago, two gentlemen who are well known and whose works may be found in every well regulated engineer's office in the civilized world, had occasion to express their views in relation to the cone of car wheels. One of the gentlemen regarded it as a "fine-spun theory," the benefits of which were more fancied than real. He argued that as wheels soon wore down so as to destroy the cone, there was no real advantage to be derived from the plan. And even if the cone was not destroyed by wear he could see no good in it. To strengthen his position he argued substantially as follows: Briefly, a cone placed on an inclined plane will travel in a curve, but place two cones in a rectangular frame, after the manner of two car axles in a truck frame, and they will not travel at all on an inclined plane unless force is applied. This is true, and the reason is apparent at a glance. Now if we hollow out these cones so as to give the cones no bearing except at the extreme ends, then the concern will travel down an inclined plane and run in a curve. The other gentlemen referred to experimented with the cones, and decided that they would not travel, but probably he gave them a bearing their entire length, which precluded the possibility of their moving by their own gravity on a slight incline. If anyone has any doubts about the advantages of the conicity of wheels, and takes any interest in the matter, he can satisfy himself by the following simple experiment: Procure two empty thread spools, large ones, and plug up the holes with soft wood. Get a block of wood, the merest trifle thicker than the spools are long, and about 3½ inches long. Some pieces of a cigar box, or some stiff card-board will do. Cut the card-board the length of the block and somewhat wider. With some carpet tacks fasten these pieces to the black. Perforate the card, and run toilet pins horizontally through the holes into the centers of the plugs in the spools. You now have a truck to all intents and purposes. Let the pins work the least mite free in the holes. With a sharp knife pare off the one-sixteenth of an inch or more from the circumference of one end of the spools. Now place the affair on your table and raise one end of it (the table) gradually, and you will soon see your truck travel off on a curve. If the thing does not behave just right lay a light weight on it.

To return to the wearing off of the cone of wheels. This is owing mainly to the following causes, all of which may be removed and some millions of dollars saved by their removal. One great source of this trouble is that mentioned by Mr. Halley, to wit: the narrow "footprint" on the rail. The remedy for this has been pointed out above. Another destructive agent is steel-plated frogs. When a wheel jumps from the wing rail of a frog to the sharp steel point it loses a portion of its conicity, and for this there is a specific remedy. Another cause is the grinding away of the larger diameter of the wheel tread by brake shoes and sliding wheels. The brakes having no bearing on the tread except a narrow strip next the flange, destroy the cone. This, with sanded rails and slipping of drivers, soon makes hollow wheels. With properly formed rail heads and frogs, and brake shoes fitting the tread so as to wear away its whole surface, there should be no difficulty in preserving the conicity of wheels, of

the desirability of which there certainly can be no question.

This brings to mind that something has been said of late about widening gauge on curves. There is no question but this is beneficial under some circumstances, but it should not be overdone. Assuming that there is a benefit derived from the cone of wheels, it is desirable to get the most of it on sharp curves. In such cases (very sharp curves) a moderate widening of the gauge would be beneficial unless on a heavy grade. Perhaps the greatest advantage from widening gauge may be found on the elevated roads, where only light trains are run. With a heavy freight train on a sharp curve and heavy grade, the tendency will be to pull the wheel flange against the inner rail. In such cases the widened gauge would be an injury rather than a benefit. On the other hand, a train running in the opposite direction would be greatly relieved from coned wheels and widened gauge. Again, on a level curve on a freight road the widened gauge would be an injury to trains running in either direction. On a passenger road the widened gauge would be beneficial on grades and curves where the contrary would be the case with heavy freights. The gauge on the 60° curves of the Metropolitan Elevated Road, was widened three-quarters of an inch. Doubtless this will prove beneficial on either grades or levels on the elevated roads where there are no heavy freight trains, and the treads of wheels can be kept from wearing hollow, and no worn out foreign wheels, as on surface roads. As the rolling stock is always at home on the elevated roads, the cone of the wheels can be preserved and the widened curves will prove beneficial under all circumstances, whereas on a surface road thousands of wheels are run that are worn to such a degree as to leave the largest diameter of the tread near its outer edge. With all such wheels the widened gauge is an injury.

From the foregoing, it is clear that under some circumstances it is advisable to widen the gauge, while under others it is not. Mr. John F. O'Brien, general superintendent of the East Tennessee, Virginia and Georgia Railroad, recognizes this fact, and in his book of instructions to the roadway department (Rule No. 11), he says: "Any widening of the gauge on sharp curves will be done only under special directions of supervisor in each case." From this we are to understand that he considers the matter an important one, but of too delicate a nature to be tampered with by a person not specially skilled. And, to use a vulgarism, "that is about the size of it." In widening gauge, grades, nature of traffic, and velocity of trains should be taken into account.

A study of some of these seemingly unimportant matters would not be entirely unprofitable, inasmuch as we can never reach anything like perfection in railroading or even keep in sight of the progress made in other directions, unless we pay attention to such matters as are mentioned herein.

"Steel and Iron."

THE latest of the manuals of Technology, edited by Professor Ayrton, F. R. S., and R. Wormell, D. Sc., M.A., and published by Cassell & Company, London, Paris, and New York, is "Steel and Iron." This work comprises the practice and theory of the several methods pursued in the manufacture of steel and iron, and of their treatment in the rolling mills, the forge, and the foundry. It is a production of William Henry Greenwood, F. C. S., Assoc. M. I. C. E., M. I. M. E., and associate of the Royal School of Mines. Mr. Greenwood's book is adapted to the wants of the general student of technical science, and of the intelligent workman who wishes to possess a succinct statement of the scientific principles upon which depends the success of the several processes conducted or superintended by him, and upon which the construction of his plant or machinery is based; thus supplementing the experience and practical knowledge gained in the works, with technical instruction. Its information has been brought up to date, and the ninety-seven diagrams embellishing the work have been produced from original working drawings, drawn accurately to scale.

"Steel and Iron" is pleasantly written, very neat and accurate in its letter-press. An exhaustive index increases its value to the student.

Having explained the terms in use in the book, its author treats on refractory materials, crucibles, etc. He then proceeds with chapters on the ores of iron, the metallurgical chemistry of that metal, cast or pig iron, and its production. Two chapters on the blast furnace, its use and management, are succeeded by instruction on castings in iron, foundry appliances, etc. Equally full information on malleable iron succeeds these, followed in its turn, by sections on the refining of pig iron, puddling, forge and mill machinery, etc., and steel and ingot iron. The five chapters completing the work are the most comprehensive and satisfactory account of the production of steel, in the various ways adopted, which we have encountered.

The work under review would be found of value to every person taking an intelligent interest in those leading modern industries comprehended in the manufacture and use of iron and steel. Its distribution among studious workpeople would serve to increase their respect for their occupation, enlarge their enjoyment of life, and improve their usefulness. "Steel and Iron" is, moreover, commended heartily to the attention of persons selecting books for mechanics' and students' libraries. Access to its pages could not result otherwise than in the intention to possess a cheap manual which is teeming with useful information, very pleasantly conveyed.

A NEW route is to be opened which will be advantageous to the commercial interests of San Francisco. This will be by means of the Oregon Pacific Railway, having its western terminus at Yaquina Bay and its eastern terminus at Boise City, Idaho Territory. The new road will run through the most fertile valley (the Willamette) in western Oregon, and tap in eastern Oregon a very large section composed of gradually rolling hills which is capable of being brought under the plow and turning out well to the acre. From Yaquina Bay to San Francisco, connection will be made by steamer. The pioneer in the line sailed from New York, February 22, for San Francisco en route to Yaquina Bay. The railway from Yaquina Bay is expected to reach the Willamette Valley in full time to help move this year's crop, and within a year or a year and a half thereafter extended to Boise City. It is expected that the construction of the new road will serve to make up, at least in part, for the blow San Francisco received by the construction of the Northern Pacific Railroad.

A RETROSPECT:

BEING

A Complete History of Railroad Progress in America.

Compiled from this Journal, beginning Fifty-two years ago.

CHAPTER III.

INCORPORATION OF THE HUDSON AND DELAWARE RAILROAD—BALTIMORE SEEKS RAILROAD COMMUNICATION WITH PENNSYLVANIA—SHELBY COUNTY, KENTUCKY, ALL ALIVE FOR THE NEW IMPROVEMENT—INCEPTION OF THE ERIE—CONVENTION AT BINGHAMTON TO FURTHER A PROJECT FOR CONNECTING OWEGO WITH NEW YORK CITY—THE GRAND CENTRAL IN EMBRYO—INCORPORATION OF A RAILROAD IN OHIO—WHAT GOVERNOR THROOP HAD TO SAY ABOUT CHARTERS FOR RAILROAD COMPANIES.

AN act of incorporation under the title "Hudson and Delaware Railroad," for the construction of a railroad from the village of Newburgh, through the county of Orange to the Delaware River, was passed by the New York legislature, April 19, 1830. During the summer of 1831 a survey of the various proposed routes was made under the direction of H. G. Sargent, of Fort Anne, Washington County, and January 7, 1832, a correspondent of the JOURNAL was able to say: "This railway will strike the Delaware River at or near Carpenter's Point, where it will come into connection with the Delaware and Hudson Canal. From the Delaware River, it is intended, under a charter from the State of Pennsylvania, passing the village of Milford, and crossing over Cobb's Gap, to enter the valley of the Lackawanna in the very heart of the coal region; here a junction will be formed with the Lackawanna Railroad (the stock of which we are informed has been practically engaged), which terminates at or near the Great Bend of the Susquehanna, thence along the level banks of that river to Owego, where we unite with the Ithaca and Owego Railroad, thus forming a complete communication from Ithaca by railways, to the village of Newburgh." Accompanying the article from which this quotation is made, is a letter from the pen of H. G. Sargent, in which he says he has not "the slightest doubt the construction of the road will offer a safe and lucrative investment of capital, even if the work should cost double the amount." His conviction was based mainly on the conclusion that the want of fuel in New York, and in all the cities and towns from New York to Troy, and in the cities and large towns bordering on the Atlantic east of New York, made some other communication with the valley of the Lackawanna than that afforded by the Hudson and Delaware Canal, "absolutely necessary." The JOURNAL'S correspondent gives great significance to the announcements that "part of the capital of the Hudson and Delaware Railroad has been already subscribed, and as soon as the Engineer's Report is published, books will be opened in the city of New York, for the subscription of the balance not taken up," by preceding them with the following solemn declaration: "I do not think that I hazard anything in affirming that by means of this work a load of coal may be taken from the mines and landed in the city of New York in the course of twenty-four hours, the speed required not exceeding seven and one-third miles per hour."

The intention of connecting Paterson, New Jersey, with the Hudson River, opposite New York, was formed early in the history of railroads in this country. A company was incorporated for this purpose by an act of legislature of New Jersey, on the twenty-first of January, 1831, with the capital of a quarter of a million and the power to enlarge it to half a million. Work was begun forthwith, and by the early part of January, 1832, only a month's work was necessary to the completion of the road as far as Paterson Landing, a distance of five miles. Whether in order to complete the road, Bergen Hill should be tunneled or not, agitated the minds of the persons interested in the construction of the road, but the hope was indulged that by the next fall the entire road would be completed and operated, at no greater expense than $250,000.

In the early part of 1832 the "Oxford Railroad Company, of Chester County" had not built the road to construct which they had procured a charter as far back as 1828. Their concession gave them the right to construct a railroad "from a point intersecting the Pennsylvania Railroad in the great valley in Chester County, to the Maryland Line, in a direction to Port Deposit." Taking this fact into consideration the inhabitants of the upper part of Cecil County, in meeting assembled, voted affirmatively on a preamble approving the project of the Oxford Railway Company, and a resolution appointing a committee to draft a memorial to the Senate and House of Delegates of Maryland, praying an act of incorporation to a company "by the name and style of the 'Baltimore, Port Deposit and Maryland Line Railroad Company,'" with the object of securing railroad communication between Baltimore and Port Deposit, thus connecting Baltimore with the road projected by the Oxford Railroad Company of Chester County.

In many parts of the United States, about the time when our "No. 2" was published, the disposition to construct railways was evidenced by enthusiastic meetings and very practical resolutions. Said publication, date January 7, 1832, records a meeting of the inhabitants of Shelby County, at Shelbyville, Kentucky, at which resolutions were passing protesting against the pretermission of "the great commercial trade of Shelby county" in the route proposed by the Lexington and Ohio Railroad Company, and appointing a committee to prepare such information as to said trade, for presentation before the directors of that company, as would lead to the route being changed so as to include Shelby county.

Delegates from the New York counties of Chautauqua, Cattaraugus, Allegany, Steuben, Tioga, Broome, Chenango, Delaware, Otsego, Greene, Sullivan, Tompkins and Seneca, eighty-six in number, met at Owego, December 20, 1831, and resolved: "That it is expedient that application be made to the legislature of this State, at their ensuing session, for the incorporation of a company with the necessary privileges, to construct a railroad from Lake Erie, commencing at some point between the mouth of Cataraugus creek and the line of Pennsylvania, and to run

from thence, through the southwestern tier of counties, by the way of the village of Owego, to the Hudson River, or to connect with railroads already chartered, or otherwise, as may be deemed most advisable, with a view to reach the City of New York, by the best railroad route, with a capital of $5,000,000." A committee was appointed to draft the memorial to the legislature, and the convention adjourned after having expressed its approval of the application to the legislature, for the construction of a railroad from Ithaca to Geneva.

Five days prior to this gathering, so fruitful in important consequences, delegates from counties of New York and Pennsylvania, met at Binghamton, and particularly united in and approved of the application for a railroad from the termination of the Ithaca and Owego Railroad, at Owego, to the City of New York, as immediately affecting their own interest; and appointed a committee to prepare and circulate a memorial to the legislature, embracing all the advantages contemplated in the said project. This convention also formally approved of the contemplated application for a railroad from Ithaca and Geneva, and of the projected line from Owego to Lake Erie.

The practicability of constructing a railroad from Albany to New York engaged the attention of a meeting held at Hinsdale, on the twenty-ninth of December, 1831, which passed resolutions that deprecated the connecting of the two cities by any route outside of New York State, and urging the greater directness of the way from New York city "through the counties of Westchester, Putnam and Dutchess, to Hinsdale, in the County of Columbia, thence to some point on the river opposite the City of Albany," over a contemplated circuitous way through a part of Massachusetts and Connecticut. The meeting passed, moreover, a resolution which is hereby commended to the appreciation of very States-loyal people: "Resolved, That in the opinion of this meeting, our enlightened legislature will not grant a railroad, any part of which shall, without a natural necessity, be in any adjoining State (consequently beyond their control), thereby conferring great lateral advantages on citizens of such State, in preference to her own constituents."

Ohio could not well be missed in this review of railroad activities. The JOURNAL quotes from the *Dayton Journal*, of December 27, 1831, as follows: "The bill to incorporate the Mad River and Lake Erie Railroad Company, passed the Senate on Saturday, with a few slight amendments, which would no doubt be agreed to by the House; so that the bill will become a law. It provides that the capital stock shall be one million of dollars, in shares of $50, with liberty to increase it to two millions; and authorizes the commencement of the work as soon as $50,000 are subscribed. It gives the company the right to construct a double or a single railroad from some point in Dayton to Springfield; thence to Urbana; thence to Bellfontaine; thence to or near Tiffin; thence to Lower Sandusky City. The bill passed the House on Wednesday last, with only three dissenting votes, and in the Senate there was only one vote against it." "The length of this railroad," adds the editor of the AMERICAN RAILROAD JOURNAL, "will be about 115 miles."

In his very comprehensive message, dated "Albany, January 3, 1832," Governor E. T. Throop had this to say about the new way of conveyance:

"Railroads are of modern invention, more simple and less expensive than the Roman, French, or Dutch roads, and probably better adapted to a cheap, safe, and rapid transmission of persons and commodities. There is reason to believe that for great thoroughfares, they will not only supersede every other kind of road, but enter into a successful competition with canals also. They are not so well adapted to general use as either roads or canals, because they will admit upon their track none but public vehicles of a peculiar construction.

"The directors of the Liverpool and Manchester Railroad in England, say, in their report made last May, that they have been able to reduce the price of carrying goods one-third, and of passengers one-half; that the railway is peculiarly adapted to the conveyance of heavy and bulky articles, and that the conviction is now general, that traveling by the railway is the safest, as well as the cheapest and most expeditious.

"The public papers have announced that numerous applications will be made to you for charters to construct these roads in various parts of the State; and the question will be presented for your decision, whether joint-stock companies shall be created to make them, or whether this kind of improvement shall be no further extended. If it should be deemed expedient to progress in these works, then the embarrassing questions will arise, how many shall be made, under what restrictions, and what routes shall be selected.

It is very obvious that a long period must elapse, that this generation and many others, and even centuries will pass away, before all those improvements, which are worthy the enterprise of the government, and which in time will be wrought, can be undertaken upon the public means alone. Shall we then forbear to possess ourselves of these advantages, if they can be obtained without imposing public burthens? Charters create monopolies, which are odious to a certain extent, and ought not to be granted, except to accomplish some great public good which cannot be effected without them. The good to be effected, as well as the impossibility of attaining it through other means than private interest, is manifest; and I trust that some of the most meritorious of these applications will receive your sanction with proper reservations.

"By inserting the clause, now so common in charters, saving to the legislature the power to alter, modify and repeal them, and by reserving to the State the right to take possession of them as public property at pleasure, on equitable terms, charters for railroads may become eminently promotive of the public good, and I do not hesitate to recommend them as worthy of your profound consideration.

"In lending a favorable ear to those projected improvements upon routes contiguous to, and intersecting our canals, or pointing to the sources of their trade, the legislature should be extremely careful to do nothing which may interfere with the canal revenues, or retard the payment of the debt. It is supposed that companies may be formed to take charters for railroads upon the most important routes, with the condition of paying into the public treasury such rates of toll, that no loss of revenue will result from their interference with the business of our canals."

The reader is left to digest the departed governor's wisdom at his own sweet leisure.

(To be continued.)

MR. ARTHUR E. RENDLE, of New York, has been awarded the contract for the erection of the Horticultural Hall of the World's Exposition, New Orleans. The building will be permanent and the largest conservatory in the world. It will be 600 feet long and 194 feet wide, with a central tower ninety feet high. Work was begun this month. Twenty-five feet on the sides will be devoted to foreign and domestic plants and flowers, the central space being reserved for a display of 20,000 plates of fruit from all parts of the world. The Art Hall will include a marble building constructed of blocks from the various States. The main hall will be cruciform, with the walls of glass. Immediately inside of the walls, and running along all the sides of the building, tables for flowers will be placed. At one end there will be a boiler to warm an orchid-house. A glass partition will separate the flowers from the fruit, and under the tower in the center, a pyramid of plants is to be constructed.

THE longest river in the world is the Mississippi, reckoning from the source of the Missouri, being 4,500 miles, or equal to the combined length of about thirty-three millions of Esterbrook's mammoth falcon pen and penholders.

Railway Matters in Canada.

SUMMARY OF PROPOSED RELIEF FOR THE CANADIAN PACIFIC—MR. WOOD'S ARGUMENT IN ITS FAVOR—THE FINANCIAL CONDITION OF THE COMPANY—ITS CONTROL OF EASTERN CONNECTIONS—GRAND TRUNK OPPOSITION—MR. VAN HORNE'S MODE OF DEALING WITH IT—DIFFICULTIES OF THE JACQES CARTIER RAILWAY COMPANY—THE PROPOSED SOURIS AND ROCKY MOUNTAIN RAILWAY—MILEAGE IN THE PROVINCE OF ONTARIO.

THE proposed relief to the Canadian Pacific Railway Company is summarized as follows: "The Government is to make a loan to the company of $22,500,000, till the 1st of May, 1891, at five per cent. interest, to be secured by a first lien on the entire property of the company, now owned or hereafter to be acquired, including the main line, extensions and branches, together with rolling stock and steamers. On the extension from Callander to Brockville and Montreal an existing mortgage is to retain its priority. Should the company go into default, twelve months, either in the payment of interest or capital, the property mortgaged shall, *ipso facto*, and without notice or proceeding of any kind, vest in Her Majesty, and be taken possession of by the minister of railways. To enable the company to pay its floating debt, an immediate advance of not more than $7,500,000 is to be made."

In the House of Commons debate on the Government proposals as above, Mr. Wood (Westmoreland) has made a notable speech advocating their passage. He said that the advantages to follow a speedy construction of the line would be a speedy development of the great country which it traversed, and a rapid development of transcontinental trade. The powerful influence which the rapid completion of this railway would exercise over the growth of Canada was incalculable. In deciding on the mercantile aspect of this loan, of course the extent and value of the security was a paramount consideration. Supposing it was proposed to the Government to purchase back the lands here offered—twenty-one million acres at one dollar and fifty cents per acre—the House would unanimously adopt the proposition as being a paying investment. He then considered the land tendered as being alone ample security for this loan. But in addition, the Government was to hold the whole main line, branch lines, steel steamships, rolling stock, and the whole real estate of the company. He held that, moreover, the experience of the past two years, and the great increase in the carrying trade of the completed portions in 1883, over that of the preceding year, most satisfactorily solved the problem that the Northwest would supply a paying traffic to the line. Indications are strong that the Government will succeed in the passage of a bill based upon the resolutions including its features, which have received an affirmative vote in the House of Commons. Such bill is now before the House. It has been read twice, and at this writing, the date is fixed for the third reading.

A main difficulty with the opposition seems to be, that no way is clear whereby the Canadian Pacific can repay the obligations which, in case the Government programme is carried out, it will incur. As put by *The Monetary Times*, of Toronto, the assets of the road are unavailable. "And these assets," says our contemporary, "consist largely of wild lands, in a country where wild lands are to be had almost anywhere in a distance of a thousand miles. Of the twenty-five millions of acres of land granted to the company, 13,775,705 acres have been earned. The slow rate at which the lands have sold is seen in the fact that there are 21,246,600 acres still to sell. Of the three millions and three-quarter acres sold, a million and a half went to the North West Land Company; so that there have been sold to private parties only two millions and a quarter acres." Besides the loan proposed, of $22,500,000, to be made at five per cent. interest, there remains $7,380,912 required to complete the guarantee fund deposit, to be paid by November 7, 1888, inclusive, and charged four per cent. interest. The floating debt to be paid at once out of the proposed $22,500,000 is $7,500,000. Should the road be completed by the spring of 1886, running expenses must be met in addition to the obligations indicated; and the loan of $22,500,000 must be paid in 1891. The company has put into the main line, branches, and connections $37,377,155 more than it has received from the Government, which sum includes $8,710,240 paid on account of the guarantee fund, $4,028,604 on rails and other materials, and $3,482,257 towards acquiring a right to the seaboard. Deducting the total of these amounts, there is a balance of about twenty-one million dollars against the Canadian Pacific proper. Naturally enough, the financial propositions of the Government in behalf of the company are being strongly criticised; but as was said before, there seems to be the probability that the Government proposal of aid will be carried, notwithstanding the strength of the opposition, and the powerful attempt of the Grand Trunk Company to defeat these liberal proposals by urging unfairness, in that the affiliation of the Canadian Pacific with the Ontario and Quebec and Credit Valley roads brings the C. P. into competition with it. The substance of the Grand Trunk demand is described to be the surrender of the lines acquired by the Canadian Pacific in Ontario, to the Grand Trunk Company, in exchange, on terms, for the North Shore Railway between Montreal and Quebec.

In answer to this requirement, W. C. Van Horne, general manager of the Canadian Pacific, replies in a letter to Sir John Macdonald, that the Ontario and Quebec Railway has been leased and firmly bound to the Canadian Pacific for the term of 999 years, and his company will be unable to treat for its sale until the end of that time; but he is prepared, with the authority of its board of directors, to negotiate with the general manager of the Grand Trunk for the purchase of the North Shore Railway. He further gives an account of the acquirement by the Canadian Pacific of the Ontario and Quebec system, which includes the Credit Valley and the Toronto, Grey and Bruce railways, and of the control of the South Eastern Railway, "the only independent outlet from Montreal to the south and east." These acquisitions, he claims, are necessary to insure the commercial success of his road, and to enable every community in Eastern Canada to profit by its construction. Mr. Van Horne's letter concludes with the assertion "that the lines by means of which the Canadian Pacific Company will secure independence will not cost them one dollar, but on the contrary will add largely to their profits."

At a mass meeting of the electors of St. Laurent, the difficulties of the Jacques Cartier Union Railway have been discussed, and resolutions passed of which the most important read as follows:

That the Jacques Cartier Union Railway, which was begun in September last and finished and completed at a cost of over $150,000, and which was inaugurated on the 15th December last, is for the farmers of the North Shore, from Quebec to Montreal, a new channel of direct communication with the West and the United States at all seasons of the year, and that it is with great regret that the electors of Jacques Cartier county have seen the difficulties existing between the Canadian Pacific Railway Company and the North Shore Railway concerning the fusion of this new line with the North Shore Railway which has caused and is causing great damage to the trade and business of Jacques Cartier county.

That in case the Federal Government should not come to a decision for the settling and termination of the obstacles between the Canadian Pacific Railway Company, and the Jacques Cartier Union Company, then that the Federal Government do grant to the latter a subsidy of $12,000 per mile up to St. Vincent de Paul and $200,000 for the construction of a railway bridge over Riviere des Prairies in order to continue the Jacques Cartier Union Railway to St. Martin, to be there joined with the North Shore Railway.

Said resolutions and their companions have been duly forwarded to the minister of railways.

The promoters of the Souris and Rocky Mountain Railway report that they have received the best possible assurance from English capitalists that the necessary capital will be forthcoming to construct the line as soon as the charter difficulty is settled, and the Government announces the intention of aiding the enterprise to the extent of the original land grant. The road will start either from Melbourne, on the Canadian Pacific, or from Brandon, passing through Rapid City, west to Ellis, Sarkatoon, the capital of the temperance colony, thence to Battleford, the junction of Battle River and the North Saskatchewan, a total distance of 425 miles. It is proposed ultimately to continue the line to Edmonton.

According to the annual report of the Ontario commissioner of public works for 1883, the total mileage of the railways of the province, exclusive of the portion of the Canadian Pacific west of Lake Nipissing, amounts to 3,847 miles. Of this 1,464 miles were completed prior to confederation, and 2,383 subsequent to that date. Upwards of 703 miles are at present under construction or contract. The number of miles built during the year was 102.

Apprentices in the Brooks Locomotive Works.

THE following circular was issued by the Brooks Locomotive Works, Dunkirk, New York, January 21, 1884.

"From and after Jan. 21, apprentices will be admitted to service in these works under the following rules, and no deviation will be made therefrom:

"An applicant must possess a good moral character; must be 18 years of age, with a fair knowledge of the ordinary English branches of education, and write a legible hand.

"Applications must be made to the office in writing, and must be written by the applicant.

"An applicant must possess a natural aptitude for mechanics, and have a settled personal desire and purpose to become a skillful and competent workman.

"The term of service for apprentices will be three years.

"The compensation for the term will be: First year, 7½ cents per hour; second year, 9 cents per hour; third year, 11¼ cents per hour. Ten hours constitute one day's work.

"Apprentices will be required to attend the night school such evenings in the week as may be designated for such purpose. Tuition and books are furnished free of charge, and from the date above mentioned attendance in the night school will be obligatory upon all apprentices who enter our service thereafter.

"Neglect of this privilege will be considered cause for immediate dismissal from our service.

"This company cannot guarantee continuance of service during the full term of apprenticeship, as the ability to do this must be regulated by the condition of their business, but they will do the best possible for their apprentices."

The following additional circular further expresses the company's intentions:

"It is the intention of this company to institute a high standard of excellence among their apprentices.

"*First*, by refusing all unfit applications, and

"*Second*, by using special endeavors to offer them every advantage to become not only skillful and competent workmen, but also to educate them in the principles underlying mechanical construction, and afford them opportunities to study and practice elementary mechanical drawing. Hence no applicant will be accepted until a full investigation of his character and elementary education is made.

"An applicant must be 18 years of age; must make application in his own handwriting through the mail addressed to our office, and must be prepared to furnish credentials of his character, education, and aptitude for mechanical pursuits.

"Applications proving satisfactory upon investigation will be placed on file in the order of their application, and accepted applicants will be advised when their services are required."

THE *National Car Builder* remarks that when forty-two inch wheels were first used in this country under passenger cars, there was a good deal of fruitless discussion about their utility as compared with that of smaller wheels. What discussion failed to make clear, however, has been determined by use and the knowledge thereby obtained. Much can now be said in favor of large wheels, showing their superiority to small ones for passenger service, that could not have been said with the same confidence a few years ago. English practice could, of course, be referred to as being conclusive, so far as the style of "carriages" on English roads was concerned. But our cars are altogether different in size, weight, and construction. Probably no road in this country has given forty-two inch wheels a more thorough trial than the Boston and Albany, and we are informed that with these wheels such a thing as hot journals is practically unknown on that road, none having been reported for a long time. This is attributed to the fact that the journals revolve slower, their surface speed with the forty-two inch wheels at forty miles an hour being no greater than that of journals with thirty-three inch wheels at thirty-one miles an hour. This is a moderate speed if the journals are well packed, and they ought therefore to run cool. It is also asserted that passengers perceive a difference in the riding of cars having the larger or smaller wheels, and that they prefer those with the large ones. This is significant if not conclusive. But there is still another thing that many observing people have noticed, and that is, that large-wheel trains appear to move at a comparatively moderate speed, when the distance covered shows a speed of forty and forty-five miles an hour.

Our English Letter.

Written Specially for the American Railroad Journal.

FENCE WIRES AS TELEGRAPH WIRES—SHIP BUILDING ON THE CLYDE—TRAMWAYS IN GLASGOW—RAILWAYS IN INDIA—THE NEW TAY BRIDGE—THAT TO CROSS THE FRITH OF FORTH—ANOTHER BRITISH "HOWL" AT AMERICAN RAILROAD MANAGEMENT—CHEAP RIDES IN LONDON—STATISTICS OF METROPOLITAN RAILWAY.

I OBSERVE that one of our papers—I have forgotten which one—insists upon the practicability of using wires passing through the snow, as means of telegraphic communication. "In Norway," says the writer, "the winter lines are laid on the surface of the snow." This is encouraging to the expectation that the wire fences bordering railroads in many parts of the United States can be utilized in the manner indicated.

The output of new shipping on the Clyde in the year 1883 is an example of the astonishing rapidity which characterizes the development of ship-building in Great Britain. I observe that *Engineering* places the value of the vessels completed and begun during the year, in the forty shipyards which are the leading feature of the busy banks of said river, at ten million pounds; about six million pounds more than in 1874, which was an exceptionally busy year. As a loyal Briton, I of course rejoice in the astonishing magnitude of the figures quoted; and, observing, as I hope with some considerable degree of perception, the indications of industrial policy, as represented in the Congress of the United States, I see no reason to fear that "the Yankees" will by any calculable date, become rivals with the maternal nation in the production of ships for the leading carrying trade of the world. I refrain from committing myself to one word of comment upon that feature in your commercial polity by which my country people profit so enormously. Your statesmen, of course, understand better what the policy of the United States ought to be than a humble scribbler like me; but one can't help musing a little on the matter.

I see that Glasgow—I still keep to the banks of the Clyde—has 2,306 horses and mules in its tramway service, and 233 cars, besides omnibuses and breaks, "in that same," as Pat says. Cabbing is cheap, moreover, and street travel in the commercial center of Scotland is—well, I wish every great city were equally fortunate in this particular.

The East India Association has forwarded a memorial to the Secretary of State for India, urging the claims of Hindostan for railway extension and other internal improvements. As only 373 miles of new road were constructed in 1883 in the whole of that vast country, there appears to be good ground for the memorial. With adequate railway communication India would be saved much suffering in portions afflicted with drought, and the development, especially of the wheat and cotton-growing industries, would be wonderfully promoted.

Your correspondent takes note that every precaution is being made to prevent a repetition of the Tay Bridge disaster, perhaps the only railway accident recorded in which the loss was as complete, in life and property as that of a ship in mid ocean, the City of Boston, for example. The piers are subjected to a pressure varying from eight thousand to four thousand tons, and the bridge is being constructed able to sustain a wind pressure of fifty-six pounds to the square inch. It is expected that the new bridge will be completed by the spring of 1886.

Speaking of bridges, reminds me of certain figures just made public with regard to that one now under construction, to cross the Frith of Forth. This bridge will have two spans of 1,700 feet each and two side openings of 675 feet each. Each of the three cantilever trusses weighs fifteen thousand tons, and the open spaces between them will be closed by two straight girders, each 350 feet long.

Very hard things continue to be said of American railway management in the matter of the railways on your side of the Atlantic, which have been largely built with resources of money raised here. The financial condition of the New York, Ontario and Western prompts many of these exceedingly uncomplimentary expressions, due to the fact that ninety per cent. of the shares are held in Great Britain and Ireland.

You are aware that street travel in London is cheap. Perhaps you are not equally well aware that the cheapness of the accommodation pays handsomely those who provide it. Take tramways, for instance. In presiding at the last half-yearly meeting, when the report of these conveniences was adopted, the chairman stated that in September, 1878, which was the last year of the two-penny (four cent) charge for a ride, the number of passengers carried over the same length of tramways, was 10,298,000. In five years, with the fare at half that price, the number of passengers had considerably more than doubled, and fifty per cent. had been added to the receipts.

The two-cent fare on the Metropolitan Railway was taken advantage of by thirty million persons during the year 1883. At the recent half-yearly meeting of the company £171,182 was found to be available for dividend, five per cent. per annum on ordinary stock after providing for preference stocks. During 1883, 74,204,301 passengers were carried on the company's lines, making the gross receipts £603,768. The largest number carried on any day of the year was on Whit Monday, namely, 328,482, as Sir Edward Watkin remarked to his audience at the meeting referred to, "the largest number ever carried in one day either upon your railway or upon any other."

H. A. L.

M. POISOT recently communicated to a French seientific society a note bearing upon the slipping of locomotive wheels. He tells that at the Mazenay mines, where smoke, condensed steam and general dampness combine to make the rails abnormally slippery, a remedy has been discovered by accident. A joint in one of the cylinder cocks of an engine sprang a slight leak, through which a jet of steam was impinged upon the rail. The engine driver immediately found that the wheels bit the rails so well that he was enabled to ascend a steep gradient without the usual slipping. By a slight modification in all the engines upon the works they have been made to discharge steam upon the rails when required, with the result that no more fuel is now expended upon hauling out one hundred tons of material than was formerly used for eighty tons.

A BRIDGE to cost a million and a quarter of dollars is to be built, crossing the Ohio river at Cincinnati.

THE Elmira, Cortland and Northern was incorporated March 10.

RAILROAD MEDICAL SERVICE.

BY S. S. HERRICK, M.D.,
SECRETARY BOARD OF HEALTH, STATE OF LOUISIANA.

GREAT BRITAIN AND IRELAND.

ON this subject I have been unable to obtain any information of consequence from the island of Great Britain. It may be presumed that mutual aid societies have been organized among the employés of the most important companies in Great Britain, and that the companies themselves are without any medical service on their own account.

Through the courtesy and aid of John Shew, Esq., United States vice-consul of Dublin, I have received a brief report from the secretary of the Dublin, Wicklow and Wexford Railway Company. This company has no medical staff in its own service, but "the employés have a friendly society, to which they contribute in proportion to their weekly wages. From this society they obtain pay while sick, and their burial expenses are paid when they die." The company has no hospital of its own, but subscribes to several civil hospitals, which are used by their employés.

Through the same United States official, fuller particulars have been received from the Great Southern and Western Railway Company, accompanied by a printed copy of the rules of a friendly society, organized among its employés in 1850. Any person may become an honorary member, without privilege of its benefits, on payment of £5, or by an annual subscription of ten shillings. The ordinary members consist of males in the employ of the company, at wages not exceeding fifty shillings a week, who at time of admission are in good health, of sound constitution, and not more than forty-five years old; provided they belong to no other benefit society nor enjoy a pension. A certificate of good health, signed by the society's medical officer and countersigned by his own superior officer, must accompany the application for admission to the society.

Any member convicted of crime or of fraudulent practices toward the society, forfeits membership and all contributions, unless it can be shown that he was insane. On quitting the service of the company in good standing, a member may claim half his contributions, less the amount granted for relief.

The affairs of the society are managed by a board consisting of three trustees, a treasurer, and a committee of not fewer than eight nor more than thirteen members. This last is composed of representatives of the traffic, locomotive, permanent way and police departments. The trustees are required to report annually to the registrar of friendly societies in Ireland, upon the funds of the society, according to act of Parliament; and every five years a report must be made to the same officer of the rate of sickness and mortality among the members.

The committee are charged with providing such medical attendance and medicines for the members as they judge proper. "Each medical officer shall, on being instructed, visit any members of this society and their families located within his district, at their respective residences, and provide them with medicine and medical attendance during their illness or disability, as their circumstances may require, and see and certify to the health and condition of candidates and others, upon receiving orders from the secretary to that effect; and such medical officer or officers shall not be allowed to receive any remuneration other than that allowed by the committee." Sick members are also visited at least once a week, or as often as the committee direct, by visiting officers appointed for this purpose.

Relief is granted to members in case of disability for work from sickness, but not in case of accident incurred while in discharge of duty to the railway company; from which it may be inferred that the latter is responsible to its employés for the results of accidents.

Dues to the society are deducted monthly from the pay of members by the railway company, and passed to the credit of the society.

The following is taken from the regulations of the above society:

TABLE SHOWING ENTRANCE FEES, MONTHLY SUBSCRIPTIONS, AND BENEFITS—

For—1st. Weekly Full Sick Allowance for First Six Months.
2d. Weekly Reduced Sick Allowance for Second Six Months.
3d. Payment at Death.

Age of Member at time of Admission.	(CLASS I.) Wages from 22s. to 50s. inclusive. Sick Allowance. Full, £1 0 0 Reduced, 0 15 0 Payment at Death, 10 0 0		(CLASS II.) Wages from 16s. to 21s. inclusive. Sick Allowance. Full, £0 15 0 Reduced, 0 10 0 Payment at Death, 7 10 0		(CLASS III.) Wages up to 15s. inclusive. Sick Allowance. Full, £0 10 0 Reduced, 0 7 6 Payment at Death, 5 0 0	
	Subscription	Monthly	Subscription	Monthly	Subscription	Monthly
	s.	d.	s.	d.	s.	d.
20	2	6	1	9	1	3
21	2	7	1	10	1	3
22	2	7	1	10	1	3
23	2	8	1	10	1	3
24	2	9	1	11	1	4
25	2	9	1	11	1	4
26	2	10	2	0	1	4
27	2	11	2	0	1	4
28	3	0	2	0	1	6
29	3	1	2	1	1	6
30	3	1	2	2	1	7
31	3	3	2	4	1	8
32	3	5	2	4	1	8
33	3	5	2	5	1	8
34	3	6	2	5	1	9
35	3	7	2	6	1	9
36	3	7	2	7	1	9
37	3	9	2	7	1	10
38	3	11	2	9	1	11
39	4	0	2	10	2	0
40	4	1	2	11	2	1
41	4	3	3	0	2	2
42	4	5	3	1	2	2
43	4	7	3	3	2	3
44	4	8	3	3	2	4
45	4	11	3	5	2	5

Entrance Fee—1st Class, 2s.; 2d Class, 1s. 6d.; 3d Class, 1s.

Members who joined the society before the 1st of May, 1882, will be charged for rates shown for 28 years of age.

An amendment to the scale of sick allowance, adopted December, 1882, provides that the amount shall be three-fourths of the member's wages for the first six months of sickness in any year, and one-half thereafter; in no case to exceed £1 per week.

As will be observed, if sickness is prolonged beyond six months, the allowance thereafter is reduced; and if beyond a full year, with allowance paid up, the individual is dropped from membership.

No member is entitled to relief, whose illness grew out

of immoral or irregular conduct, nor while an inmate of any workhouse or lunatic asylum.

The sum assured after death is payable to the widow, children, executors or assigns of the deceased; but the committee may require the certificate of one of the society's medical officers, to show that there was no reason to attribute death to poison, violence, or criminal neglect; and in all cases the death must be attested by the registrar of deaths.

So far as I am able to learn, no railway company in the United Kingdom has instituted, in its own interest, a physical examination of employés; and it will be found hereafter that some of the railroad companies in distant colonies have not waited for an example there to protect themselves and their patrons from the consequences of defects of sight and hearing, and faults of vital organs in their employés.

As might be supposed, there is no provision for medical supervision of the personal hygiene of employés, and the sanitary condition of railway carriages, buildings, grounds, etc.

Regulations relative to transportation of live stock, to prevent over-crowding, deprivation of food and water, too long confinement, or admission of diseased animals to cars, are made and carried out by the Veterinary Department of the Privy Council.

(To be continued.)

LITERARY NOTES.

"THE Creators of the Age of Steel," a new work by W. T. Jeans, is introduced by a very readable chapter, in which the period since 1850 is given as "the age of steel." Dr. Whewell is quoted as saying, in 1851, that gold and iron rule the world. Which is the mightier potentate of the two appears in a comparison made by the writer: "At the end of 1882 it was estimated that the probable yield of gold in the State of California, was $230,000,000. The Bessemer process has saved even more than that vast sum." Mr. Jeans urges, by both example and precept, the attention of young men to the various industries created by applied science and mechanical skill, which will have a greater future than can now be conceived. His biographical matter, forming the body of his book, is presented as encouragement and stimulus to the entering earnestly upon developing the industries of "the age of steel" by those who aim at a successful career. Five chapters with Sir Henry Bessemer as their subject; two, Sir William Siemens; and one each, Sir John Brown, Mr. S. G. Thomas, and Mr. G. J. Snelus, constitute matter which includes the interesting story of the inventions that have particularly distinguished the industrial history of the generation since 1850. Mr. Jeans has written a useful book with an easy pen. His work is not technical, but the ordinary reader acquainted with its contents, would be very well informed on the subject treated. A book like this cannot fail of its purpose, to interest and instruct, and incite by example. New York: Charles Scribner's Sons.

BOSTON is the birthplace of Vol. I, No. 1, of *The Beacon*, a large eight-paged illustrated weekly paper for persons of culture. It starts well, with two chapters of a new novel, "Farwell's Folly," by J. T. Trowbridge. A sermon by Phillips Brooks, a poem by H. Bernard Carpenter, a well-considered and well-written department headed "The Library," numerous bright editorial paragraphs, reviews of concert, theatrical and musical matters, a department "On Change," correspondence from New York, Philadelphia, Naples, Paris and England; and "The Dining Room," are the principal miscellaneous contents. *The Beacon* is handsome, pleasing, and very good, but we should have liked it better were it made up into thirty-two pages instead of eight. Possibly the low price (five cents) precludes the possibility of this arrangement. The best wishes of the AMERICAN RAILROAD JOURNAL attend *The Beacon*.

"RAILWAY TURN-OUTS," by Jacob M. Clark, is the latest of the valuable technical works published by D. Van Nostrand, No. 23 Murray street, New York. It is issued in its present form by permission of the publishing committee of the American Society of Civil Engineers. The book exhibits, in a systematic form, a method of practice intended, so far as it differs from others, to save time and abridge labor. No more needs to be said in its commendation than that it provides a system of laying out railway turn-outs instantly, by inspection from tables. The railroad engineer will see the advantage of such a work, which is produced in a form convenient for its being carried in the pocket as well as for desk use. It is, moreover, exceedingly well printed in type of convenient form and size, and strongly bound.

GEORGE H. ADAMS & SON, No. 59 Beekman street, New York, will publish, May 1, 1884, the first number of *American Progress*, a geographical, industrial, and descriptive monthly magazine. Their idea is to give the latest information concerning the United States, accompanied with a map perfect up to date, thus meeting a need felt by our leading business men. The first number will contain a new map of Colorado, with full description, history, mining interests, railroads, etc. Dr. Brockett, whose fame as a writer on geographical subjects is established, will edit the new journal, and the reputation of the publishers as makers of atlases, etc., during the past thirty years, affords the certainty that their part in the magazine will be efficiently filled. Their new map of Dakota, just received, is made from copper-plate engravings, upon a uniform scale of twenty miles to an inch. It embodies the latest information.

J. L. SMITH, No. 27 South Sixth street, Philadelphia, has just published Owen's map of Mexico, which is invaluable for use in railroad and telegraph offices. It is the most complete map of our neighbor country, giving all that the most exacting man of business and student need in such production. It measures about 6x4, is beautifully colored, and mounted on canvas with rollers. Accompanying the map is a table of altitudes from the "Memoria del Ministerio de Fomento."

F. C. TALBOT & COMPANY, Evansville, Indiana, are publishers of Forth's Official Railway and Business Guide for all the States and Territories governed by ninetieth meridian or central time. This useful work, complete, with maps, etc., is published monthly. Its multifarious contents are of interest and value to the traveling and general public, and its form and appearance are respectively convenient and pleasing.

A PERSON named Henry Greer is the editor of a pam-

phlet called "Recent Wonders in Electricity, Electric Lighting, Magnetism, Telegraphy, Telephony, etc., etc.," consisting, as it appears, of reprints from many sources, American and foreign. Its price is given at given at two dollars, including the advertisement of a "college" in which the compiler seems to be interested.

"WHAT shall we name it?" is a dictionary of baptismal names for children, containing two thousand names with their meaning and the countries from which they originated. We hope all our readers will need it for reference. New York: John C. Stockwell, 25 Ann street.

THE *Investors' Supplement of the Commercial and Financial Chronicle*, February, 1884, contains a vast amount of railroad information, with maps, and is, therefore, a valuable work of reference.

Lubricating and Lubricants.

BY E. F. DIETERICHS, CLEVELAND, O.

IV.

APPLICATION OF LUBRICANTS.

THE use of poor lubricants and their injudicious application are the indirect causes of many accidents, stoppages, breakdowns, and expensive repairs. The injury is worked imperceptibly and slowly, but surely.

Proprietors and employés often look upon lubricating merely as a necessary evil, to be treated contemptously, as the expense caused thereby is looked upon as an unwelcome one. The same proprietors who would consider the use of the best coal for fuel and the best kind of boiler and engine for the production of steam and power, the wisest economy, frequently fail to observe that lubricants and lubricating are as important factors as either of them. They will persist in buying cheap and poor lubricants, and find it too troublesome to give occasionally their personal attention to the manner in which the lubricants are applied and how they should be applied. The mere pouring on of any kind of lubricant is not of economical or practical use, and the plea often made that "the hands pour the oils on any way" is absurd; it is an acknowledgment of bad management and want of proper control. The men cannot help pouring the oil on to keep the bearings cool, when it runs out below as fast as they pour it on above. That is what makes them use it recklessly. With oil capable of doing its work with regularity and efficiency they would not do so, as lubricating also means exertion, requires attention and causes labor which few care to exercise needlessly while attending to their regular duties. It is an error to expect one kind of oil, however good, to serve thoroughly and economically for all the manifold requirements in a factory, and it needs not much observation to understand the fallacy of such a course. Lubricating a cylinder and valves means lubricating in the presence of heat and moisture; and the lubricant to be effective must possess greater consistency than a lubricant applied to machinery at ordinary temperature. Moreover, lighter and rapidly moving machinery requires a more liquid, penetrating but nevertheless tenacious lubricant than is needed for machinery of heavier weight and slow motion.

Oils used for lubricating running machinery effectually cannot be expected to do efficient duty for screw or thread cutting or drilling also, as the requirements in each case are widely different. The heating of bolts, pipes or screws and their dies, emanating from frictional motion, is not so continuous as in the case of running machinery, where the lubricants have to absorb and rapidly dispose of the heat continuously evolved. In screw-cutting, etc., the metallic surfaces are of very different density, their contact with each other is short and a constant changing of metal takes place, affording ample time for the radiation of the frictional heat; and hence the glutinous animal oils with their superior heat-absorbing but slow heat-radiating power are more efficient for screw-cutting than the mineral oils.

From want of better knowledge of the characteristics of lubricants, much being dependent on their quality, many mishaps from entirely different causes are charged to them as inefficiency.

Applying lubricants to practical trial on machinery, requires judgment as to difference in their characteristics. Very good and tenacious lubricants are sometimes rejected as unsatisfactory or inferior on account of their inability to reach the place where the work is to be done, being expected to work through contrivances intended and fit only for the use of lubricants of lighter consistency; also such as change their characteristics under influence of temperature, or are perhaps required to find their way through feed-holes too small or bearings too light, and cups with adjustable feed or strands, without adjusting them to suit their consistency. Not unfrequently lubricants on trial, perfectly clear, are simply poured on to bearings full of gummy deposits from the impurities or decompositions of the lubricant previously used, and when the result appears unsatisfactory no thought is given to the fact that the lubricant on trial had to contend with and is made accountable for defects which are not its own. The same with cylinder lubricants; they are only too often condemned after a short and injudicious trial or stubborn attempt to feed through cups unfit for feeding other than more limpid lubricants, or such as lose their consistency when they become heated. They are accused of gumming and cutting when in reality they were contending with the impure deposits from lubricants previously used. Frequently when applying cylinder lubricants, entirely satisfactory when applied direct, complaint is made that the lubricant will not work through cups with so-called sight-feed, will cling to the sides of the glass and not pass automatically in drops through the columns of water; yet this very clinging quality proves that the lubricant can take the same tenacious hold on the sides in the cylinder and on the piston without being blown out by the steam before having performed its duty there.

When a change is made from the use of one kind of lubricant to that of another, especially if the latter is better and freer from gummy matter, it stands to reason that accumulated deposits left by the former, suddenly and partially softened by and becoming incorporated with a small quantity of the latter, may work injury if not speedily relieved by liberal additions, until all such deposits are removed and the new lubricant has been enabled to form its own bearings. For such result the better lubricant is often blamed and rejected before it has had time enough to show its merits.

A lubricant to be powerful must possess fluidity and tenacious consistency and retain the same nearly uniform

at all temperatures. The applying of such a lubricant to heavy bearings is the most efficient and economical lubricating. To do it efficiently, the feed hole in the caps of the bearings must be boxed large enough and proportionate to the consistency of the lubricant, to enable it to diffuse itself uniformly all over the bearing, and on very long bearings it would be more practical still to have two such holes at equal distance from each end. Such lubricant will cling to the metal and remain there when lubricants subject to changes of temperature would run through as fast as poured on.

We are deceiving ourselves when we believe that we are practicing great economy when we apply grease in place of oil for lubricating our machinery. We soon find out that we have to depend on the expenditure of a larger amount of power and its equivalent in heat to keep the grease melting; and if not properly applied and looked after unlooked for injury to the bearings may be the result. The running with so much accumulated frictional heat is a drag on the motion which sooner or later we find to be equivalent to the increased expenditure for the production of power, and the wear on the machinery producing the motion. It is of course better, especially on heavy bearings, to use grease of good quality properly applied than to use oil of poor quality, yet in using grease we have to consider, all other points set aside, the difference in temperature which the grease requires for its melting point, to set it at equal basis with oil, liquid at ordinary temperatures. This amount of heat, and so much more as is required to reach its high vaporizing temperature, the grease has to carry, and is therefore unable to relieve the bearings of more than a limited amount of frictional heat created there.

Careful and ingenious experiments, made by intelligent and experienced investigators, have shown that the temperature on the frictional surface run with grease was some thirty-eight degrees greater than the temperature of the atmosphere of the room, while using oil as lubricant the increase of temperature was only eight degrees, and the amount of friction with grease was found to be some thirty per cent. greater than with oil. Increase of friction is equivalent to increased expenditure for the production of power, and increase on the wear of the machinery.

Applying grease through feeding-holes, or the principle that the frictional heat increasing on the metal shall melt the grease and cause it to flow through the hole is wrong, when we consider that we lubricate to prevent a rising of temperature on the bearings; and we should therefore not depend on each rising to enable us to lubricate. When lubricating with grease we should apply it as broadly as possible, through slots cut in the cap of the bearings and resting direct on the moving shaft. The practice with engineers of keeping their lubricants on the steam-chest or boiler is wrong, as the lubricant applied in this highly heated state is unable to absorb more than a very limited amount of frictional heat.

The colder, the more directly and regularly a lubricant is applied to the place to be lnbricated, the more efficiently and economically will this be done.

(*To be continued.*)

A NEW volume will begin with the April number.

Some Causes of Unsatisfactory Results in Painting Cars.

BY A. J. BISHOP.

IN opening this subject I wish to invite a free and open discussion on any of the points taken. The first thing that a railroad usually does is to build brick or stone machine and car shops then put up an old shed for a paint shop. Now, the material that is used in the machine and car shops is largely wood and iron, and the expansion and contraction is so little that really these materials could be used in almost any atmosphere. But when it comes to the painter, he is given a shop generally devoid of the three greatest requirements necessary to a perfect paint shop, which is light, heat and ventilation. The materials the painter has to deal with are very sensitive and are subject to atmospheric and other changes. Paint will not dry properly in a dark shop, and will dry unevenly in a damp shop. In cases where the tracks run lengthwise in the shop, and there are windows on the sides and not skylight enough to give the same light between the cars, cracking will most surely occur on the dark side if the car is brought up in the same time, as the paint on the dark side will not be thoroughly dry. So I consider light one of the greatest essentials of a good paint shop. Heat is also a great factor in the drying of paint, and I consider steam-heating the safest method, with the coils of pipe running around the sides of the shop, as then a uniform temperature can be maintained. Where stoves are used you can never secure a uniform heat, and they frequently generate gas which will produce many deviltries both in paint and varnish. This, of course, occurs more frequently in a poorly ventilated shop. Hence good ventilation is also very important, and without it no perfect job can be produced, as it is not practical to ventilate by the windows. There is only one way, and that is to obtain ventilation through the roof. There should also be ventilation under the floors of the paint shop. Where the floors are solid there is a great amount of dampness, which is very injurious to paint and varnish. I can't help but feel that the want of proper light, heat and ventilation are the prime causes of much of the trouble experienced in the paint shop, and this conviction forces itself on me more strongly on account of what is demanded from the paint shop at the present time. I refer to the material shortening of the time now given to paint a car. While many parties still use boiled oil in car painting, I cannot but think it is a great mistake, and believe it is the cause many times of the paint cracking and blistering. I deem boiled oil the correct thing for outside oil painting, but where a color is to be protected by varnish I think raw oil soould be used, and very little of that, and if you desire to hasten its drying, use a good coach Japan. Referring to the causes of cracking, the simplest illustration is the mud-hole. The cracks in a mud-hole are caused by the portion underneath drying slower than the outside, hence the rule that the undercoats in painting should be made to dry quicker than the outer coats, and whenever this rule is violated cracking will surely occur. This applies to varnish as well as to color coats.—*Oil, Paint and Drug Reporter.*

AN exhaustive abstract of the report of the Pennsylvania Railroad Company, will appear in the next issue.

Master Mechanics' Association Circulars.

THE following are circulars of inquiry recently issued by committees of the Master Mechanics' Association through the secretary's office:

LUBRICATING VALVES AND CYLINDERS.

Your Committee on the Best Material for Lubricating Valves and Cylinders respectfully ask for information in reply to the following questions:

1. What kind of lubricant do you use on valves and cylinders?
2. Have you made any experiments with other kinds of lubricants? If so, please state results obtained.
3. How is the lubricant applied, by self feeders, cup or steam chest, or through pipes from cab? Please describe the device you are using. If self-feeding cups, where is best location?
4. Have you made any experiments with self-oilers? If so, please describe the different devices and give results of experiments.
5. What mileage are you getting with the lubricant you are using, to the pint or pound?
6. What results have you obtained in the wear of valves, piston, packing and glands with the lubricant you are now using compared with others you have tried?
7. What in your opinion is the best method of applying the lubricant to cylinders?
8. If you are using a compound that is made of several lubricants please give proportions.

In answer to above questions please do not confine yourself to the questions, but give any facts or exact data you may have bearing on the subject.

Please send replies not later than April 1 to H. Schlacks, Superintendent of Machinery, Illinois Central Railroad, Chicago, Ill.

H. SCHLACKS,
J. M. BOON,
H. MIDDLETON, } Committee.

LOCOMOTIVE AND TENDER TRUCK WHEELS.

1. How many locomotive and tender trucks have you equipped with Allen paper steel-tired wheels?
2. How many with Paige plate steel-tired wheels?
3. How many with other makes steel-tired wheels?
4. How many with chilled cast-iron spoke or plate wheels?
5. State if any trouble with tires coming loose or breaking, and to what extent in proportion to whole number in use.
6. What kind of wheel do you consider safest for engine and tender trucks?

Will you please give in table furnished below the relative cost of cast-iron wheels and steel-tired wheels?

CAST-IRON WHEEL.	STEEL-TIRED WHEEL.
1 First cost	1 First cost
2 Cost of application	2 Cost of application
3 Cost of removal, for defect or worn out	3 Cost of turning tires, including removal and application
4 Amount of damage, by defect or breakage	4 Cost of removal for defect or breaking
5 Loss of service of engine being held for application of wheels	5 Amount of damage, by defect or breaking
Total cost	6 Loss of service of engine being held for application of wheels
Credit, value of scrap	Total cost
Net cost	Credit, value of scrap
Miles run	Net cost
Cost per mile	Miles run
	Cost per mile

Respectfully submitted,

CHAS. H. COREY,
R. C. BLACKALL,
J. B. ROSS. } Committee.

A MAN in a sleeping car, went through a terrible accident, in which the sleeping car rolled down an embankment, without waking. It was noticed, however, that as the car struck the bottom he murmured: "Don't, Jane; I'll get up and start the fire."

Communications.

A Civil Engineer's Grievance.

Editor American Railroad Journal:

I SUPPOSE that although the age of chivalry is past and gone, the spirit which induced it still lives, and will, so long as there are wrongs which should be righted. We are not permitted to see men with iron clothing on their bodies, and iron pots on their heads, and sheet iron boots on their feet, sitting astride of horses protected with garments of the same material, going about to see that the strong do not take advantage of the weak; but we have the editor with his pen, and the press room with its thundering engine, to put before the eye of the public all that is mean and contemptible, and to hold it up to derision and obloquy. And these, unlike the celebrated Don Quixote, have not outlived the time when their kind of chivalry may serve society. Had that worthy lived later than he did, his chivalric spirit might have found some other field of usefulness, and he might have become the compeer of Watt, Stevenson or Brunel in the constructive arts, to confer blessings upon his race. Still later he would have found himself surrounded by his instruments and his scientific books, a useless wreck of a man for whom the world has no further use, as his services are no longer required, owing to the "improved methods." Now, unfortunately, a fair and just classification places the writer among the deluded individuals who are inspired by the desire to confer a blessing upon humanity, in smoothing their paths, and relieving their suffering beasts of burden—with those whose praiseworthy but enthusiastic efforts have resulted in personal discomfiture almost as disastrous as that which befel the Don when he mistook the giant arms of the wind-mill for those of some monster intent upon wide-spread destruction. He felt that he was well prepared for the conflict. His armor was well fitted, and his lance well poised. By nature and education he was acknowledged to be preëminently qualified for the task he had imposed upon himself, but after a few successful conflicts he was left to discover that there was nothing more to conquer, and that his heroic habiliments and polished spear were likely to rust and crumble away, for the very want of an object upon which to burnish them.

In order to illustrate the writer's meaning, he will relate a story. A gentleman with whom he happened to have some acquaintance, requested him as a personal favor, to visit a town in which he had a personal interest in a place not far from New York. There had been a disastrous flood in the region, which had destroyed much public and private property, and some lives had been lost. He visited the scene of these disasters with some of the county "superwizors" as he believes they call themselves, and he suggested that it was very bad to have people drowned and bridges cleaned out, and muddy water running around houses and into them, destroying carpets and furniture, and scaring women and children in that way; and that an engineer who had authority to make a thorough survey of the stream and regulate the flow of the water, and to determine the plans of the future bridges, could do a good work. He was informed in reply that they, the

officials in his company, having been elected by the people, were competent to do all of that and much more, and that when they reached their decision they would be pleased to hear from him, and would entertain a proposition to reërect the required work. Understanding well from previous experience what this meant, and believing that as there had been no panic in the market to affect the price of county commissioners or other officials in a way likely to be to his advantage, he decided to tarry in that town only a very short time, and to content himself with what he had learned by viewing the ruin which bull-headed stupidity and ignorance of the plainest of physical laws had wrought. As he was sped away in the railway train, he lighted his pipe in the smoking car and reflected thus: What is likely to be the logical sequence of this state of things? Next spring those official engineers will advertise for bids to rebuild those bridges, accompanied by plans and specifications, and the iron bridge men will pour into that town until they will be thicker than hair in hotel hash, and each of them will "see" as many of the official engineers as he can. The landlords will do a thriving business, and one fellow will go home with the pleasant assurance that his generous libations and liberality, and his superior knowledge of how to discover the weak points of poor human nature, have distanced those of his rivals. And the bridges will be built again, and the moral rectitude of the officials, if they had had any, will be swept away at the letting, and the bridges will be swept away by the next flood. In the meantime the engineer will have starved to death, or will have sought some other means of procuring a living; and then the people will be tired of being taxed and drowned, and they will say that, as we cannot have bridges which will stay where they are put, we will get along without bridges. They will content themselves with reflecting that they will be able to ford the stream in dry weather, and in wet weather stay at home. In time, they will muse, we must lapse back into a condition of semi-civilization and finally into barbarism.

Another case occurs to the writer. In the town where he lives and pays taxes, there is, or was, a stone bridge or culvert. This stream crossing has been torn out several times, and the ruins of the last are still there. It is enough to make one laugh to see in how absurd a manner the masonry was put in, were it not that one has to bear his part in paying for it. Do you suppose for a moment that the writer or any other engineer having any anxiety about his future or fear of eternal punishment, could get the slightest hope of a chance to design a bridge for that place? The arms of that wind-mill would send him so high, did he make the attempt, that he would enter at once into the kingdom come, and Hades would lose forever all hold on him.

What, then, are engineers to do? This one has decided that he will not, of necessity, be driven into contracting, as he is quite satisfied with small gains, and has more constructive than financiering talent. He will not undertake to overshadow the weak virtue of those who have secured their election to positions which should be those of honor and trust, neither will he become a scientific prostitute. Must they, like Diogenes, live and die in disagreeable impecuniosity, or should they show fight and "sock it to them," (the dishonest politicians) as Socrates, that grand old Greek philosopher did to the aldermen *et al.* of his day? If modern civilization cannot and will not afford him that work which he has fitted himself to perform, he will accept the situation; but in doing so it is unreasonable to suppose that, as the owner of his own home, he will submit to that taxation which perpetuates a pernicious system of building public works. He must not be regarded as the vassal, the slave, of the vile distillment of ward politics. He would rather retire to the primitive forests, and seek the society of wild animals, and struggle with Nature direct for his subsistence.

If the people can do without us engineers we must do without the people; become tramps or hermits; take our instruments and books into huts or caves with us, and like the Don read in musty volumes of the days that are past and gone; pore over wrongs that should be righted, and regret that the light of the lamp of science, shine it ever so brightly, can never penetrate the thick-skulled pate of the pot-house politician.

If you can furnish a solution of what seems to be a difficult problem, the writer doubts not that you will receive the heartfelt thanks of many others than he.

PONTIFEX.

NEW YORK, February 11, 1884.

Road-Bed Track and its Fixtures.

Editor American Railroad Journal:

THE earnest discussions now going on in several periodicals, on train dispatching and signal devices and systems, seems to me, in these days of frequent accidents from bad masonry, weakly constructed bridges, broken rails and spreading of track (all of which causes can be remedied), like a man building a house without any, or at least with but a poor foundation; and the question might justly be asked, of what avail is the dispatcher's order for train so and so, to run so and so, and wait further orders, if the track is not in a condition for these orders to be fulfilled?

A railroad with sure foundation and good quality of stone on culverts and abutments, with substantial material and good workmanship in bridges and trestles, cuts and fills wide and properly sloped, ditches regularly cleaned out, ties evenly spaced, rails laid true to engineer's stakes on tangent and curve, and track kept free from low joints and loose bolts, would be a good railroad, and the train dispatcher's best assistant, and would, so far as the track is concerned, materially assist in his orders being fulfilled.

Have we got good material and properly distributed in our bridges, good foundations for our masonry, or appliances and connections to prevent low joints, loose bolts or broken rails? Accidents, almost daily recorded, say we have not.

Road bed, track, and its fixtures, would certainly be an interesting subject to comment upon and very profitable to many an aspiring engineer, and perhaps some of our practical engineers and roadmasters, who read these lines, would give through your columns their conclusions, drawn from years of experience and observation, and present suggestions which would tend to remove some, if not all, of the miserable evils which now exist in track and its fixtures.

A BEGINNER.

TROY, New York, February 14, 1884.

Tramways.

American Street Railway Association.

President.—William H. Hazzard, Brooklyn, N. Y.
First Vice-President.—James K. Lake, Chicago, Ill.
Second Vice-President.—George B. Kerper, Cincinnati, O.
Third Vice-President.—D. F. Longstreet, Providence, R. I.
Secretary and Treasurer.—William J. Richardson, Brooklyn, N. Y.
Office of the Association, cor. Atlantic and Third Avenues, Brooklyn, N.Y.

PROPOSED RAPID TRANSIT ARRANGEMENTS IN NEW YORK.

ON the ninth of February the Rapid Transit Commissioners, New York, completed the first part of their work, namely the "location" of routes. Their first meeting was held in the mayor's office, December 12, 1883, and their labors began on the following day, when a meeting was held at which addresses were delivered by prominent citizens and by William P. Shinn, president of the National Cable Railway Company. The next day another meeting was held at which resolutions were offered declaring that there existed a necessity in the city for additional steam railways for transportation of passengers, mails, or freight. These were passed ten days later. Numerous meetings were held during the intervening period and after, in which many men of local reputation took part, and suggestions almost innumerable on the subject of the proposed improvements, were received from property owners in the city. On the ninth of January the commissioners started on a trip to Chicago, where they inspected the operations of the cable system run by the National Cable Railway Company. After their return, five days subsequently, meetings with the Commissioners were resumed, and their time otherwise occupied with the examination of various competing systems of transit, until, on the ninth ult., the first stage of their laborious undertakings was ended in their proposal of twenty-nine new routes of rapid travel. As described by one of the Commission, their scheme involves three roads running lengthwise of the city and the balance cross roads.

To decide upon the kind of superstructure and the mechanical construction of the means of rapid transit, was the second of their duties undertaken by the Commission. On February 15, they passed a resolution declaring that at present they considered the cable system of construction upon the new routes the most desirable, whether wholly or in part upon the surface. Ten days afterwards the Commissioners decided that the company to be formed for the purpose of constructing, maintaining, and operating the lines of surface and elevated railways should be named "The New York Cable Railway Company," and fixed the fare of one person for a continuous trip between two points on any two connecting or intersecting routes at five cents between four in the morning and midnight, and six cents the remaining four hours of the twenty-four. At the present writing they are seeking from the State legislature, an extension of the time originally given them for their work. The outlook is obstructive litigation on the part of corporations interested in present franchises, the interests of which would be possibly temporarily injured were the plans of the Commission executed, and from individual owners of property; and a hard fight at Albany over the proposal to remove by legislation what stands in the way of the Commissioners' scheme being carried out.

There is unquestionably very much room for improvement in the matter of street travel in New York city. Already an outcry is heard that the National Cable Railway Company has been unduly favored by the Commissioners, seeing that it claims to own all the patents which have been successfully applied to street railways, and to have the exclusive right to their use east of the Rocky Mountains; and that, therefore, the New York Cable Railway Company will be virtually the National under a new name. The Commissioners, as it appears to us, are not fairly dealt with when this is urged against them; the presumption, on the contrary, is that their work so far, has been done consistently with the obligation laid upon them to do their duty as honorable citizens representing, not a company, but the entire population of the greatest city on this continent. Surely public virtue ought to be presumed of public servants, and that citizen does not deserve well of his country who finds a grievance in the fact that those who provide a great public convenience largely profit by it. To this cause all public improvements on a great scale must be referred. In the present instance, the corporation taking franchises from the Commissioners, incurs the obligation to pay their salaries and expenses, and to accept the probable difficulties in the way of litigation and testing the constitutionality of such legislative enactments as at present obstruct the work to be undertaken. While the interests of certain horse-car companies seem to be threatened by the proposed improvement in rapid transit, we cannot but believe that the expansion of means augmenting the desirableness of New York as a place of residence, will, in the long run, promote the gain of all who are engaged in the transport of its freight, mails, and teeming population.

THE present session of the New York legislature will be memorable for the exacting proportion of time and labor given to affairs of this city. What with schemes of rapid transit, the question of what should be the measure of the mayor's powers and responsibilities, etc., etc., the rural legislator must find New York and its affairs a splendid burden.

Tramways in Massachusetts.

IN their Fifteenth Annual Report, the railroad commissioners of Massachusetts give returns from twenty tramway companies. During the year from September 30, 1882, to corresponding date 1883, one was dropped from the list—the Union. The aggregate capital stock is $7,524,700.00, being an increase of $523,120.00; the gross debt has also increased $19,494.71, and now amounts to $4,431,666.94. The aggregate of stock and gross debt is now $11,956,366.94.

One corporation made a dividend of twenty-two per cent., one of ten, two of nine, six of eight, one of seven, eight of six, one of three; while nine declared no dividends.

The average rate of dividend on the total amount of capital stock was 5.8 per cent.; and the net earnings (interest deducted) amount to 4.6 per cent. on the aggregate of capital stock and gross debt.

The whole length of track, including branches, sidings, and double track, amounts to 305,746 miles; being an increase of 8,281 miles. The average cost was $20,499.35 per mile for permanent way, $9,922.10 for equipment, and $10,655.32 for land and buildings; making a total cost of $41,076.77 for each mile of road owned. The number of round trips was 2,291,990, an increase of 64,047 over the previous year; with a mileage of 15,337,504, an increase of 655,977. Passengers were carried to the number of 88,229,796, being an increase of 4,306,219 over the number carried during the preceding year. The number of passengers carried on the street railways exceeded the number on the steam roads by 26,699,049.

The gross income was $4,583,042.53, an increase of $88,084.88. There was an increase of net income of $143,911.11; and a decrease of dividends paid amounting to $17,367.00.

The average amount received for the conveyance of each passenger was 5.20 cents, and the average cost of carrying each person amounted to 4.33; the net profit to the companies being 0.87 cent, against 0.63 cent, as compared with last year. The average cost of a round trip was $1.67, with a profit of 33 cents, being an increase of 9 cents over last year.

The whole number of horses was 8,418, being an increase of 482; the number of cars was 1,762, showing an increase of 110, and the number of other vehicles was 134. The number of persons employed on street railways was 3,541, being an increase of forty over last year. The number of accidents reported was fifty-five, of which five were fatal. The number injured the previous year was forty-nine; six of whom were killed.

THE time is opportune to remind the public that one plan of rapid transit for New York proposes an underground line in Broadway on the arcade plan. It provides separate tracks for through travel, on which trains will be run at the rate of thirty miles an hour, with stopping places at proper intervals, and other tracks for way trains, with more frequent stops. The plan involves, moreover, underground sidewalks and facilities for placing pipes, wires, etc., where they will be accessible without disturbing the street surface. It is being discussed by the legislature in Albany, where it finds influential favor, and the chances of its adoption seem good.

Cable Roads in Philadelphia.

THE *Record* says that the contracts for constructing cable roads to be made for some time by the Philadelphia Traction Company have been entered into, and the work will be proceeded with immediately. The lines are to be completed by the first day of July by the contractors, under a penalty of $250 per day for each day after that date that the companies are debarred from using them.

The building on Market street will be seventy-nine feet in front and 176 feet in depth, and three stories in height. The first floor will be devoted to machinery, and the second and third to the storage of cars. At each of the stations there will be two Corliss engines of 250 horse power each, that can be run up to 300 if necessary. Next season the cable road will be extended on Seventh and Ninth streets to the southern terminus of the line, on Sansom and Filbert streets, and on Lancaster avenue as far west as the Park.

There are now in course of construction at the shops of the Market street company, in West Philadelphia, a number of new cars especially designed for the cable roads. They are designed to run in couples, and will weigh about two and one-half tons each. The front end of the clutch car and the rear end of the connecting car will be closed. Passengers will enter by the back platform of the first car, and then pass into either one of the coaches they desire. The platforms will be inclosed and there will be guards about the wheels. Stops will only be made at the main street crossings to take on or leave off passengers. The same grip as is now used will still be continued, but it will be attached and detached by a mechanical device that will obviate the raising of the trap-door in the floor of the car, as is the case on the experimental Park line.

English Improvements in Mechanism for Tramway Service.

THE claims for a system of propelling tramway and road cars are (1) the mode of hauling or propelling street cars by means of a constantly traveling endless rope running in a tube (or tubes), and which rope is kept in position at intervals by sheaves below and above each tube, having a longitudinal slit on its upper surface, which is made on one or both sides of it and having suitable openings at convenient distances to enable the sheaves or gripper to be withdrawn, and (2) the mode of working the gripper upon a separate vehicle or dummy. In a newly-patented construction of wheels for railways and tramways, projections on the inner face of the tire retaining rings in combination with recesses in the wheel tires are arranged to prevent the bodies of the wheels moving in a rotary direction within their tires. In electric tramways and vehicles to be used thereon, the electric conductors are placed in a trench below the ground; the trench is is provided with a cover having a small longitudinal slit to admit of the free passage of the parts carrying the sliding contact pieces; the conductors consist of sheets of copper or other conductors forming a lining within a groove in a longitudinal sleeper formed of four pieces; the sliding contact pieces are in the form of cylinders made of sheet brass, the edges of which are not soldered. Tramrails are constructed in two parts, one part consisting of the head, vertical rib and base flange, and the other

consisting of a channel rail supporting and partly inclosing the first-mentioned part, are designed to be bound to underlying and laterally adjacent portions of the road pitching; correct relation between these portions of the road surface being thereby maintained whilst the rails themselves are capable of being removed without disturbing the surrounding roadway; this relates also to the construction of fastenings for securing the rails. An improvement in the construction of tramways and apparatus for facilitating the hauling of vehicles thereon by means of cables or ropes, relates to the construction of a device or apparatus usually termed the "grip," whereby the car may be connected to or disconnected from the moving wire rope in the underground tube; to the mounting of the grip which is placed upon a frame carried by and between the axles of the car, and is operated by suitable mechanism from either end of the car; to means for automatically disengaging the car from the rope at certain points on the line, as for instance where two ropes cross; to means for guiding the rope around a curve, and to the tube in which the rope travels.

TRAMWAY NOTES.

A SOLUTION of the difficult problem of rapid street travel may be assisted by the discovery of a new motor known as "The Triple Thermic Motor." The new motive power is the vapor of bisulphide of carbon. It has been in practical use in driving a sixty-eight horse power engine for more than six months past in a cement paving manufactory on West Forty-sixth street, New York. The discoverer of the means of applying the new power and the machinery adapted to its use is W. S. Colwell, formerly of Pittsburgh, who, it is stated, has been at work many years on their application. The material from which the vapor is generated, bisulphide of carbon, is a discovery of the last century. The force and power of the vapor in its application are said to far surpass that of steam, and its application and regulation are stated to be under a more perfectly safe control than those of steam. The invention or discovery consists in evolving bi-sulphide of carbon into a vapor for operating machinery, by generating heat in a generator and transferring it into a vessel containing bisulphide of carbon. The latent heat of the steam is utilized to convert the bisulphide of carbon into vapor, only 118° being necessary to produce this vapor. A prominent engineer of Chicago, in giving the result of his examination of the new motor, says: "I saw a fifteen-horse power boiler, with very little fire under it, generating steam, which generated the new motor, which in turn ran an engine of sixty-horse power." A syndicate has been formed which controls the invention and all its patents, with a capital stock of $25,000,000, of which $8,000,000 has already been realized on stock. Ex-Governor Hubbard, of Texas, and Ex-Collector Beard, of Boston, are mentioned as being largely interested in the new motor syndicate. When Marius Sellers, an engineer of Chicago, was asked: "Do you think that the vapor of bisulphide of carbon will supplant steam in the near future?" he replied: "When I tell you that the intelligent engineering experts have been deploring the loss of ninety-nine per cent. of the latent heat of steam in the ordinary boiler, and when I say that all the heat practically is saved by the use of the new motor, you may judge for yourself as to what I think about it. It seems to me that these fellows have solved the problem at last." W. S. Colwell, the inventor, is one of a family of nine sons, six of whom are preachers, and there is not a poor one in the lot. The president of the present association, or union, is the Rev. Dr. T. M. Colwell, a brother of the inventor, pastor of the largest Baptist Church in Lowell, Massachusetts, and a man who stands high among Baptists throughout the country.

A NEW plan of rapid transit in Brooklyn, is projected. The company having the project in hand is to be known as the Brooklyn and Long Island Cable Railway Company. The incorporators are Austin Corbin, William Richardson, J. Rogers Maxwell, Newberry H. Frost, Frederick A. Schroeder, Henry W. Maxwell, Charles Storrs, William B. Kendall and Samuel W. Bowne, of Brooklyn, and Henry Graves, of Orange, New Jersey. The capital stock of the company is $1,000,000, with the privilege of increasing the same to $5,000,000. The new company is the result of a combination between the Long Island Railroad and the Atlantic Avenue Railroad men. The proposed routes of the company will be a scheme of rapid transit, meeting the needs of the city in an even and approximately perfect manner. Work on the new road will be begun just as soon as the consent of the mayor and common council can be obtained. William Richardson, president of the Atlantic Avenue Railroad Company, says that it will not be necessary for the company to have a commission appointed as under the act of 1875, because it intends to proceed under the cable act of 1866. If the mayor and aldermen grant consent, and no unforeseen legal difficulties obstruct the progress, the company expects to have the entire road completed within a year. It is claimed that by means of the stationary engine and cable system a speed of thirty miles an hour, if necessary, can be attained on the proposed elevated road.

THE amount of capital authorized for the construction of tramways in Great Britain and Ireland to the end of June, 1883, was £14,617,842, the amount paid up £9,929,789, and the total capital expended £9,750,827. The length of line open for public traffic 671 miles; the number of horses belonging to the companies, 20,122; locomotive engines, 117; cars, 2,819; and the total number of passengers carried, 295,721,171. The gross receipts were £2,211,973; the working expenses, £1,752,360; and the net receipts, £459,613. These figures represent the gross amounts for the seven years ended June 30, 1883, and relate to 141 companies, of which twenty-eight, with a mileage open of 170, belong to local authorities, and 113, with a mileage open of 501, belong to other bodies or companies.

REGARDING the city of Buenos Ayres tramways, an English exchange says: "The two last traffic returns record the largest 'takes' the company have ever had, and the traffic for the year 1883 exhibits a great increase over the 'exhibition' year of 1882. That increase approaches £15,000 over 1882's traffic, although in 1882 there was an increase of about £18,000 over 1881's yield, due in a measure to the exhibition which was then held. The material increase in the traffic is, however, due to the greater facilities and accommodation given in the car service, and therefore is accompanied with higher expense. The additional traffic has yielded additional profit, if not exactly

in the old proportion, and the outcome of the year's operations will doubtless be more than usually gratifying. The property is remarkably good."

A RAILWAY track has been built around the Brush Electric Light Works, in Cleveland, Ohio. On this track Charles T. Brush, the electrician, and his assistant, will test a new electric motor applied to street cars. An old Woodland street car has been repaired, and the motor and electrical machinery placed on the front end. The electricity will be in the car, and not in the rails, as in the Edison system. By this method the conductor of the car can operate the motor, and stop or propel the car at will. The new invention, if successful, will probably be put in use on the street car lines of Cleveland.

A ROW of straps attached to the bell cord hangs along the sides of the street cars on a west side line. Yesterday afternoon a fat woman, desiring to have the car stop, threw her weight on one of the straps. A tall man standing on the rear platform with his back to the car, clapped his hand to his ear and ejaculated, "Holy Moses!" The conductor grinned and rang the bell. "What was that?" asked the tall man, as the woman splashed through the mud to the sidewalk. "The straps," explained the conductor, "are so adjusted that they cannot ring the bell. Instead they operate a whistle which is just where your ear was. I'm supposed to hear the whistle and ring the bell. The whistle is pretty weak, though, and I don't always hear it."—*New York Times.*

THE first cab of the New York Cab Company was put on the street, February 24, and about the middle of March, between twenty and thirty more will be in operation. The rate charged per mile or fraction thereof is twenty-five cents. If a cab is kept waiting fifteen minutes by any person he will be charged for a mile. Cabs will not be sent to a house upon order without charging for the distance covered in going. They will be licensed and placed on the public stands to compete for patronage. Only fixed rates can be charged.

AT the late meeting of the American Society of Civil Engineers, held in this city, its committee on standard time expressed the opinion that the next step in time reform was to abandon the division of the day into halves of twelve hours each and to adopt a single series of hours numbered from one to twenty-four. The practical difficulty was the necessity of adapting existing watches and clocks to the proposed change. This, however, could be done at an insignificant cost.

IN the new method of warming tramway cars used on the DeKalb avenue line in Brooklyn, two pipes run under the seats on each side, charged with a composition of acetate of soda, which at each trip is heated by a jet of steam sent through it from a stationary boiler at the stable. The compound being heated is dissolved into liquid, and upon cooling throws out into the car the heat stored in it. This heat is pleasant and moist, and gives a comfortable degree of heat, an average of 60° F. being maintained.

THE Parliamentary return of tramways of the United Kingdom shows that in June last year there were ten lines of tramway open for traffic, and another in course of construction in Ireland, and of these the unfinished one and three others are connected with Dublin. The total distance covered by the whole of the Irish lines is only seventy miles, of which Dublin claims forty-four, leaving an aggregate of only twenty-six miles to serve the rest of the country. Happy Ireland!

THE West Division Street Railway Company, Chicago, has elected the following officers: President, J. R. Jones; vice-president, B. H. Campbell; secretary and treasurer, George L. Webb; superintendent, James K. Lake. The Chicago City Railway Company has elected the following directors: S. B. Cobb, Daniel A. Jones, Samuel W. Allerton, D. K. Pearsons, Erskine M. Phelps, Charles L. Hutchinson and C. B. Holmes.

PROFESSOR OSBORNE REYNOLDS says that steel ropes as transmitters of power have a great advantage over shafts, because the stress on the surface will be uniform, the velocity will be uniform, and may be at least ten to fifteen times as great as with shafts, say, 100 feet per second; the rope is carried on friction pulleys, which may be at distances of 500 or 600 feet, so that the co-efficient of friction will not be more than 0.015 instead of 0.04.

THE City Hall station of the "L" road, New York, is to be removed. An arrangement between the Manhattan Railway Company and the trustees of the New York and Brooklyn bridge provides that the elevated railroad shall connect with the bridge station, but the elevated railroad company will have no interest in the bridge structure.

AFTER the death of Theron R. Butler, Abijah Curtis was chosen to succeed him as president of the Sixth Avenue Railroad Company, and Frank Curtis was elected a director to fill the vacancy. The annual meeting resulted in the reëlection of the old board of directors, with the above change.

A TEN years' lease of the tracks and road, extending from Chatham square to Fulton ferry, New York, has been obtained by the Second Avenue Railroad Company from the Twenty-third and the Bleecker Street and Fulton Ferry Railroad companies, at an annual rental of $3,600.

WILLIAM RICHARDSON, president of the Atlantic avenue Railroad Company, is about to apply to the Brooklyn Common Council for permission to operate the horse cars of his road, at the Adams street hill, by means of a cable.

READERS of the department "Tramways" in this magazine, are invited to look out for other special features in forthcoming numbers, other than that begun on the next page. These, like it, will be of a practical character.

THE Consolidated Street Railroad Company, Columbus, Ohio, have concluded to make arrangements for the repair and manufacture of their own cars in that city, and will erect extensive shops.

J. M. JONES & SONS, car manufacturers in West Troy, have made an assignment to E. C. White, of New York, with preferences of $67,000 to M. M. White & Co., of New York.

ABRAHAM MOOG, the head of the large grocery house of A. & B. Moog, of Mobile, Alabama, is dead. He was the president of the street railroad company.

THIS year's attempt to extend the commission hours on the elevated railroads of New York will probably be unsuccessful.

THE Philadelphia tramway companies paid last year, dividends ranging from ten to sixty-two per cent.

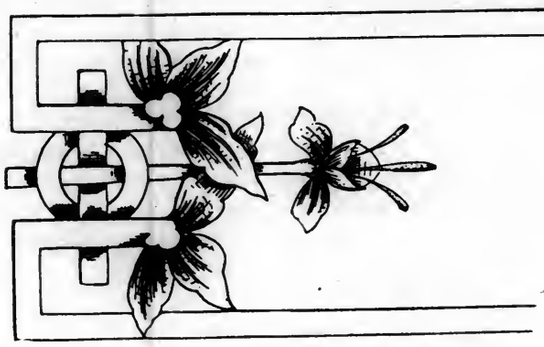


Fig. 4. Corner-post—top and bottom.

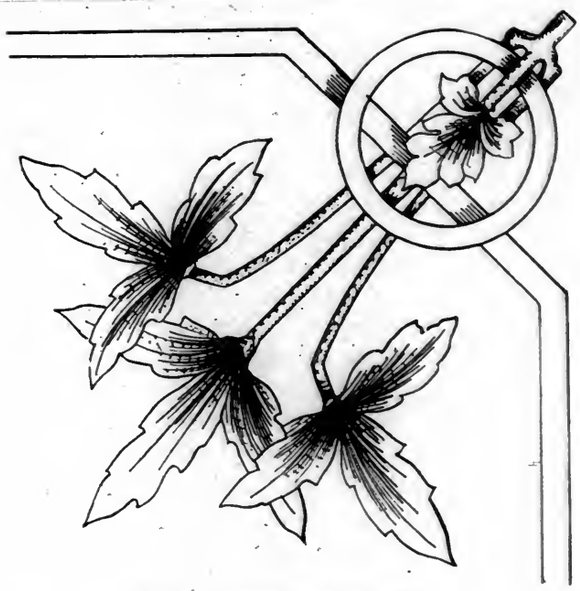


Fig. 3. Corner-piece for ends.

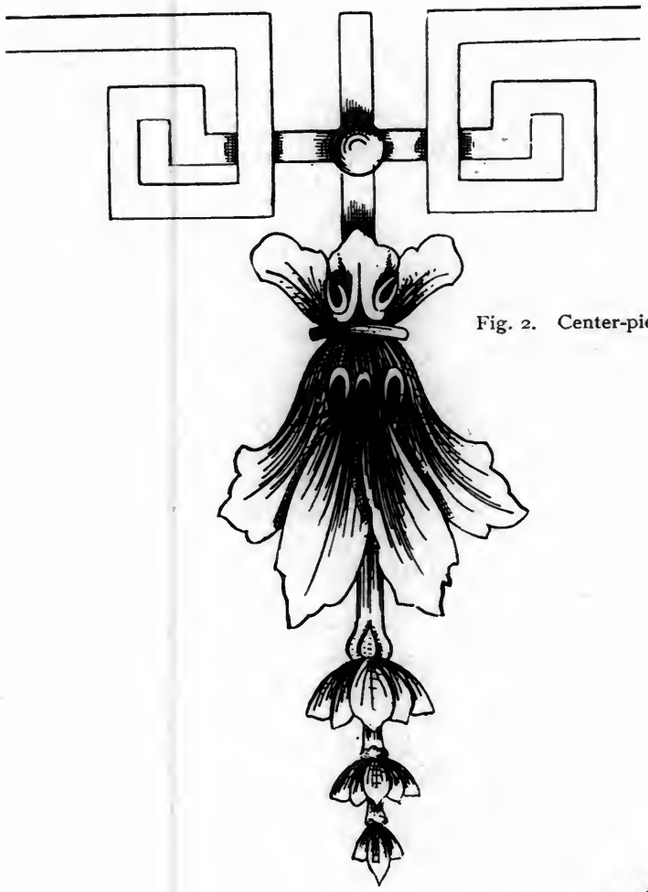


Fig. 2. Center-piece.

Fig. 1. Corner-piece.

DESIGNS FOR THE DECORATION OF TRAMWAY CARS.

Designs for the Decoration of Tramway Cars.

THE preceding page contains designs for the decoration of tramway cars, the work of an experienced hand.

Figure 1 is a corner piece on ends of side; figure 2, a center-piece put over iron batten to form panel; figure 3, corner piece on ends and on bottom panels of sides; and figure 4, corner post, top and bottom.

All of these ornaments will look rich if done in gold, edged with a line of black, or equal parts umber and sienna.

List of Patents for Inventions Relating to Tramways.

BEARING DATE FEBRUARY 5, 1884.

292,843. HORSE-COLLAR: Frazier W. Nevius, Decatur, Ill. Filed July 5, 1883.

293,049. METHOD OF OPERATING TRAINS ON CABLE RAILROADS: Paul H. Mayor, Owego, N. Y. Filed Sept. 15, 1883.

293,119. CAR-STARTER: Wilburt C. Trussell, Boston, Mass. Filed Dec. 10, 1883.

293,204. SPRING CAR-STARTER: William A. Warriner, Franklin, Gloucester county, N. J., assignor, by direct and mesne assignments, of one-half to Olin B. Pendleton, Brooklyn, N. Y., and Jesse Myers, Towanda, Pa. Filed May 24, 1883.

BEARING DATE FEBRUARY 12, 1884.

293,250. FEED-BAG FOR HORSES: George W. Horne, New York, N. Y., assignor to A. A. Knudson, same place. Filed May 9, 1883.

293,291. STREET-CAR-CURTAIN FIXTURE: John Alexander Watt, Boston, assignor of one-fourth to Henry B Sellon and James L. Whitaker, both of Somerville, Mass. Filed July 3, 1883.

293,439. HORSESHOE: Theodore C. Evans, Ludington, Mich. Filed Dec. 26, 1883.

293,592. RAILWAY-RAIL LOCK: Jas. Patterson, Brooklyn, N. Y., assignor of one-half to Henry C. Wright, same place. Filed Nov. 14, 1883.

BEARING DATE FEBRUARY 19, 1884.

293,811. FARE-BOX: Timothy B. Stewart, Hartford, Conn. Filed May 17, 1883.

293,866. DEVICE FOR WELDING STEEL CALKS TO HORSE-SHOES: John D. Hall, Orrville, Ohio. Filed Sept. 4, 1883.

293,962. STREET-CAR HEATER: James F. Gyles, Chicago, Ill. Filed June 8, 1883.

BEARING DATE FEBRUARY 26, 1884.

294,013. CAR-BRAKE: George W. Coffin, Pittsburgh, Pa. Filed Dec. 10, 1883.

294,062. HORSESHOE: Oliver H. Merrill, North Manchester, Conn., assignor to H. Lydall & Foulds, same place. Filed June 2, 1883.

294,194. CAR-DOOR: Frederick B. Brownell, St. Louis, Mo. Filed June 19, 1882.

The Chandler Safety Bit.

NEARLY all of the many devices which have been made for curbing a nervous horse become harsh and irritating to the animal the very instant the rein is touched, no matter how slight the tension put upon it. Thus the instrument which is intended to curb the horse becomes the first and greatest cause to excite him.

An exception is provided in a humane and practicable bridle bit which has just been placed on the market, and which is attracting considerable attention among horsemen. It is the invention of C. A. Chandler, of East Bridgewater, Massachusetts, for which a patent has lately been granted, and is particularly well adapted to control nervous horses on tramways. It combines the principles of the ordinary bit with those of the curb-bit in such a manner, that when the animal yields to ordinary pressure, the force exerted through the driving-rein acts entirely without leverage, but with considerable elasticity on the mouth-piece, and naturally tends to keep the animal calm. If, however, the animal becomes frightened, or if from any cause more strength is required to manage him, the bit automatically changes to a powerful curb.

This desirable result is accomplished in a very simple manner. The rein-ring is on a lever, which is hinged at the lower end of the check-piece, and is held against the check-piece by a neatly arranged spiral spring. This spring also reduces the wear by forming the hinge itself, while the strength and safety of the bit is in no way dependent upon it.

The cheapness and practicability of this bit commend it to the attention of tramway companies.

Automatic Spring Car Motor.

A REPRESENTATIVE of the AMERICAN RAILROAD JOURNAL called recently at the office of the New York Automatic Spring Motor Company, No. 39 Nassau street, New York, and had an interview with Mr. C. C. Starkweather, the secretary of the company, from whom the following facts were obtained:

There are now two companies, one in New York and the other in Philadelphia. The name of the Philadelphia company is "The Automatic Spring Motor Car and Carriage Company;" that of the New York company "The New York Automatic Spring Motor Company, limited." The office of the Philadelphia company is No. 126 South Sixth street, Philadelphia. The New York Company simply holds the patent rights to use and build the car motor in that State. The inventor, Mr. D. M. Pfantz, lives in Philadelphia, and his patents were obtained in August, 1883. The Philadelphia company are now building at Naylor's People's Works, in that city, a full-sized street car which will be completed in about six weeks. Mr. Starkweather had seen the car within a few days, and stated that it could now be counted upon as an assured success. There was no new principle involved, no novel and extraordinary workmanship needed, and the companies did not need any money. They simply wished to wait and let the public decide, and in the long run, he believed the cheapest method of transportation yet discovered would come into universal use. Messrs. Disstin & Company, of Philadelphia, are making the springs, which consist of strips of polished steel about forty-five feet long, three inches wide and one-eighth of an inch thick. Strips of steel of these dimensions were tempered with an exactitude which would have been impossible ten years ago. Ten of these springs are used in one cylinder, and are estimated at five horse power. There will be eight of these cylinders, and one cylinder will be sufficient to propel a loaded car about a mile and an eighth. The skilled workmen now engaged in building the car expect no difficulty in running it. They, however, state that ultimately a less number of springs will be needed, and the car can be built lighter, and with less cost. A spring car can be made for $1,500, warranted to run as long as the springs will hold out; and it is estimated that steel springs well oiled and hermetically sealed, as these will be, ought to last fifteen or twenty years. Street car companies can charge three cents fare and make twice the income they now make, by using the spring car. Not more than two good stationary steam engines of fifteen to twenty horse power will be necessary to any ordinary city railroad to

wind the springs. The steam engines can be placed at both ends of the route, and when not in use for winding, can run the company's repair shops. No new tracks would be necessary, no new switches or turn-tables, as the car could run backwards or forwards. As the car made no noise when in motion, and had power enough to go up an incline of 300 feet to the mile, and could triple its driving force at any time when necessary, it would undoubtedly supersede all known appliances now in use for street railways. The highest rate of speed attainable was about thirty miles an hour.

The Cooney Safety Fender for Cars.

THIS invention of P. H. Cooney is adapted to cable dummies, horse cars, and locomotives of local trains running through densely populated districts; is simple and practical in its workings, and is believed to be a safety guard in every sense of the word.

The device is to be attached near the end of the car in front of the wheels, out of the way, closing up all the open space between the car floor and the track. It accommodates itself to the interior of the car body on its springs, and to the inequalities of the road bed, remaining at all times in position to ward off injury to persons, by preventing them from getting under the car and wheels. It is automatic, and consists of a two-part hinged guard, having a diamond-shaped rubber cushion nose piece, traveling just above the road bed. The fender is protected from wear or friction on pavements or cross rails, offering no resistance to the natural movements of the car in any way. Its nose piece is constructed of thick, hollow rubber, is elastic, and yields sufficiently to prevent any injury to persons that may be struck by it. A person striking the fender in front could not possibly be dragged beneath, for the reason that being struck above or in front, forces the nose piece down.

Inquiries are answered by John H. Dawson, corner Valencia and 23d streets, San Francisco, California.

HOW TO MAKE LUMINOUS PAINT.—A certain quantity of oyster shells are taken and cleaned with hot water; they are placed at a fire for half an hour, being then withdrawn and allowed to cool. They are then pounded so as to obtain a fine powder, care being taken to separate the portion which presents a grey tinge, this powder being placed in a crucible with sulphur in alternate layers. The lid is put on and carefully cemented, the vessel being then left an hour on the fire. Once the crucible is cooled, it is opened, and it then only remains to sift the powder it contains, care having been previously taken to put aside the portions not entirely white. The powder thus prepared, mixed in the color and a certain quantity of gum, gives a coating of paint which remains luminous in the dark when it has been submitted during the day to the action of light. Two light coats produce more effect than a single heavy one.

New York Elevated Railroads.

THE New York Elevated Railroad Company has filed with the Railroad Commissioners a quarterly statement to December 31, 1883, as follows:

Cost of road and equipment		$14,345,318 44
Real estate		226,431 95
Cash on hand		242 74
Sundries		16,685 20
Manhattan Railroad Company loan		709,266 02
Total		$15,298,444 35
Liabilities		$6,500,000 00
Funded debt		8,500,000 00
Interest		245 00
Dividends unpaid		85,218 00
Rental from Manhattan		5,000 00
Profit and loss		207,981 35
Total		$15,292,444 35

The Manhattan Railroad Company's quarterly report, exclusive of structure and personal taxes, which are being disputed in the courts, shows:

Gross earnings		$1,743,829 08
Operating expenses, including water tax		992,091 00
Net earnings		$751,738 08
Operating cost, $56.99		
Income from other sources		21,374 80
Total		$778,112 88
Elevated R. R. bonds and rentals	$346,239 01	
Real estate capital, State and city taxes	24,061 52	
Rents	3,000 00	373,300 53
Balance		$399,812 35
The general balance sheet is: Lease of road and equipment		$13,000,000 00
Stocks and bonds		6,730,810 00
Real estate		623,649 64
Due by agents and others		167,473 92
Supplies on hand		136,473 49
Cash on hand		259,811 51
Sundries		1,110,157 65
Taxes on Elevated structure		186,187 41
On deposit with Trust Company pending suits		282,527 80
Total		$22,497,091 42
Capital stock—common		$13,000,000 00
Capital stock—preferred		6,150,700 00
Bonds, etc		250,400 00
Loans and bills payable		806,749 52
Interest and rentals		25,109 89
Due for wages, etc		359,647 98
Sundries		1,142,213 40
Profit and loss		762,270 63
Total		$22,497,001 42

THE phosphorus lamp, which is said to be in use in Paris by watch men in magazines where inflammable or explosive materials are stored, is prepared as follows: A clean glass phial of oblong shape (dimensions not stated) is taken and filled with boiling olive oil to about one-third of its volume. Into this is dropped a piece of phosphorus about the size of a pea, after which the phial is tightly closed with a cork. When it is required for use, the cork is removed, the air is allowed to re-enter, and the phial is recorked. The empty space above the liquid will then be found to have become luminous, the intensity of the luminosity being about equal, it is said, to that obtained from an ordinary lamp. As soon as the light grows feeble, it can be restored to its former intensity by opening the phial and permitting the entrance of a fresh supply of air.

DEAN BROS., of Indianapolis, Indiana, have recently furnished a complete set of water works for a large lumber company at Eau Claire, Wisconsin, also a large pump for the Clarksville (Tennessee) water works, and a set of vertical pumping machinery for the Citico Furnace, Chattanooga, Tennessee, the capacity of which is one million gallons per day.

JAMES JOURDAN, receiver of the Brighton Beach Railroad, has been given authority by Justice Pratt, in the Supreme Court, Brooklyn, to issue certificates of indebtedness for $75,000, which is to be used in making necessary repairs to the railroad and to the Brighton Beach Hotel. A pleasant suggestion of summer recreation in this.

New Inventions.

IMPORTANT TO INVENTORS.

THIS department of the AMERICAN RAILROAD JOURNAL is devoted to descriptions of the many and interesting New Inventions applicable to railroads, and in order to make it as complete as possible, inventors whose improvements properly come under this description, are invited to send us a detailed account of the same. This should consist of facts only, presented in clear and concise language, written only on one side of the paper, and the sheets numbered consecutively. In all cases in which it is desirable and practicable, the written description should be accompanied by a cut or cuts illustrating the invention. This or these should be marked distinctly on the bottom, with the name and address of the sender. All cuts received are preserved at this office, or returned, if desired, to the person sending them to us for use. As we have an engraving department we are prepared to make cuts, and furnish estimates of our charges for the same to those persons who write us for such particulars. That we may estimate exactly and without delay, it is necessary that we have sent to us, a photograph of the Model and a copy of the Specifications.

The reader of course understands that the editors reserve their inalienable rights to decide what "copy" they shall use, what changes shall be made in it, if any, and when they shall use it; but they guarantee the impartial consideration of every description sent them.

Descriptive articles relating to Tramways will be placed in that department.

List of Patents for Inventions Relating to Railways, Machinery, Etc.

BEARING DATE FEBRUARY 5, 1884.

292,793. CAR-BRAKE: Joseph C. Dane, La Crosse, Wis., assignor of two-thirds to Lucinda S. Card and Forrest J. Smith, both of same place. Filed April 13, 1883.

292,820. CAR-COUPLING: William Hunter, Grindstone City, Mich. Filed Oct. 16, 1883.

292,827. BRAKE-SHOE: John Joseph Lappin, Toronto, Ontario, Canada. Filed May 25, 1883.

292,834. SAFETY-GUARD FOR RAILROAD-FROGS: John Lynch, New Haven, Mich. Filed June 27, 1883.

292,861. BRAKE-SHOE: George B. Ross, Buffalo, N. Y. Filed Sept. 12, 1883.

292,882. CAR-WHEEL: Nathan Washburn, Allston, Mass. Filed Aug. 1, 1883.

292,895. CAR-COUPLING: James W. Childs, Cedar Run, Pa. Filed Dec. 15, 1883.

292,897. SWITCH-STAND: Pressley Coleman, Haysville, Pa. Filed Oct. 15, 1883.

292,910. CAR-COUPLING: John McD. Harper, Colfax, Wash. Filed Nov. 8, 1883.

292,975. MAIL-BAG CATCHER: William Angle, Welsh Run, Pa. Filed Nov. 26, 1883.

293,024. LIFE-PROTECTOR FOR RAILROAD-RAILS: Edward J. Hoffman, Sioux City, Iowa. Filed May 1, 1883.

293,026. RAILROAD-SWITCH MOVER: George W. Horne, New York, N. Y., assignor of one-fourth to Benjamin A. Dare, same place. Filed Aug. 7, 1883.

293,053. CAR-COUPLING: Frank L. McQuiston, Greencastle, Iowa. Filed May 4, 1883.

293,071. HUB FOR CAR-WHEELS: Geo. Peacock, Selma, Ala. Filed Dec. 14, 1883.

293,083. CAR-DOOR FASTENING: Jacob Rhule, Pittsburgh, Pa., assignor to himself and Onslow K. Gardner, same place. Filed Oct. 12, 1883.

293,124. CAR-DOOR FASTENER: John L. Wagner, Terre Haute, Ind., assignor of two-thirds to Tompkins A. Lewis, Indianapolis, Ind., and Henry R. Duvall, New York, N. Y. Filed July 12, 1883.

293,132. CAR-COUPLING: John E. Anger and David Porter, Schenectady, N. Y. Filed Aug. 20, 1883.

293,194. PREVENTING RAILROAD-TRACKS FROM SPREADING: John Reven, Lancaster, Pa. Filed May 9, 1883.

293,201. CAR-AXLE: George W. Stewart, Atlanta, Ga., assignor to James F. Wenman, New York, N. Y. Filed Oct. 8, 1883.

BEARING DATE FEBRUARY 12, 1884.

293,211. CAR-WHEEL: Richard N. Allen, Cleveland, Ohio. Filed July 28, 1883.

293,264. COMBINED CAR BRAKE AND COUPLER: Edward B. Meatyard, Lake Geneva, Wis. Filed May 7, 1883.

293,265. RAILWAY-CAR: Edward B. Meatyard, Lake Geneva, Wis. Filed May 7, 1883.

293,285. STOCK-CAR: Luther R. Stiles, Chicago, Ill. Filed Nov. 24, 1883.

293,302. FASTENING RAILWAY-RAILS TO METALLIC TIES: George W. Bloodgood, Wyandotte, Mich. Filed July 14, 1883.

293,319. CAR-BRAKE: John M. Grace, Chicago, Ill., assignor of one-half to Francis R. Murphy, same place. Filed March 27, 1883.

293,325. CAR-COUPLING: Charles A. Hansgen and James R. Coleman, Rock Island, Ill. Filed Oct. 19, 1883.

293,350. LOCOMOTIVE ASH-PAN: William H. D. Newth, Detroit, Mich. Filed Aug. 27, 1883.

293,381. ELECTRIC RAILWAY-SIGNAL: James C. Upham, North Sydney, and John P. Rogers, Elmsdale, Nova Scotia, Canada. Filed March 12, 1883. Renewed Dec. 8, 1883.

293,431. SPIKE-EXTRACTOR: John Ebbert, Rockaway Beach, N. Y., assignor to Phillip A. Hall, Chicago, Ill. Filed Dec. 8, 1883.

293,433. INSULATION OF RAILROAD-TRACKS USED FOR ELECTRIC CIRCUITS: Thomas A. Edison, Menlo Park, N. J., assignor, by mesne assignments, to the Electric Railway Company of the United States, of New York. Filed Aug. 9, 1880.

293,442. CAR-COUPLING: Cornelius Flynn, Brooklyn, N. Y. Filed June 12, 1883.

293,447. CAR-ROOFING: Albert W. Gilmore, Chicago, Ill. Filed Nov. 1, 1883.

293,466. CAR-COUPLING: Lorenzo D. Hooper, Coffeyville, Kans. Filed Sept. 6, 1883.

293,467. UNLOADING PLATFORM-CARS: Jas. Houlehan, Toledo, Ohio, assignor of one-half to Rathbun Fuller, same place. Filed Dec. 14, 1883.

263,479. RAILWAY-FREIGHT-CAR DOOR: Nils P. Liljeholm, St. Louis, Mo., assignor of one-third to Henry Goetz, same place. Filed Nov. 7, 1883.

293,546. RAILWAY-RAIL CHAIR: George Weeks, East Oakland, Cal. Filed Nov. 10, 1883.

293,555. TRAVELING SIGN FOR CARS: Thomas H. Bowles, Atlanta, Ga. Filed Jan. 8, 1884.

293,578. CAR-VENTILATOR: Owen H. Jones, Hartford, Conn., assignor of one-half to Frank C. Smith, New York, N. Y. Filed Feb. 15, 1883.

293,579. CAR-COUPLING: Thomas Coke Jones, Willows, Cal. Filed June 15, 1883.

293,602. LOCOMOTIVE-GRATE: Isaac W. Swallow, Kingston, Pa. Filed Oct. 29, 1883.

293,608. RAILWAY-CAR: Thomas L. Wilson, Port Hope, Ontario, assignor of one-half to Austin D. Cable, Montreal, Canada. Filed Jan. 2, 1884.

293,614. JOURNAL-LUBRICATING BOX: George F. Senter, New York, N. Y. Filed Aug. 30, 1881. Renewed Aug. 16, 1883.

BEARING DATE FEBRUARY 19, 1884.

298,618. CAR-COUPLING: James Larken Bias, Guyandotte, W. Va. Filed Dec. 19, 1883.

293,644. DEVICE FOR SECURING THE SPLICE-JOINTS OF RAILROAD-RAILS: David L. Emry, Carthage, Mo. Filed Nov. 26, 1883.

293,653. LIFE-GUARD AND TRACK-CLEARER: Chas. W. Held and Richd. B. Locke, Brooklyn, N. Y. Filed April 7, 1883.

293,660. RAILWAY-SWITCH AND CROSSING: Daniel McCarthy, Norwich, Conn., assignor to Patrick J. O'Connor, same place. Filed June 20, 1883.

293,695. RAILWAY-CAR STOVE: Alonzo P. Winslow, Cleveland, Ohio. Filed June 25, 1883.

293,705. LUBRICATOR: Addison Bradford, Brooklyn, N. Y.; Wm. W. Blackman, Administrator of said Addison Bradford, deceased, assignor of five-sixteenths to Theodore C. Wiggins, same place, Aaron R. Smith, New Brighton, and Albert S. Comstock, New York, N. Y. Filed July 25, 1883.

293,713. CAR-COUPLING: Geo. Bryan, Chicago, Ill., assignor of one-half to Alphonso Goodrich, same place. Filed June 11, 1883.

293,727. CAR-COUPLING: Alpheus Fay, Columbia, Tenn., assignor of one-fourth to Zillmon Smith, Maury county, Tenn. Filed June 5, 1883.

293,752. COVERING FOR STEAM BOILERS, PIPES, AND OTHER HEATED SURFACES: Edward Krahenbeihl and Paul Rice, Allegheny, Pa. Filed Oct. 10, 1883.

293,757. CAR-COUPLING: John J. Lloyd, Streator, Ill. Filed May 22, 1883.

293,763. CAR-TRUCK: Alexander E. McConnell, New Orleans, La. Filed June 27, 1883.

293,823. CAR-BRAKE: Charles Tregoning, Lead City, Dak. Filed Dec. 31, 1883.

293,832. REFRIGERATING CAR AND APPARATUS FOR SHIPPING MEAT: Herman G. Widman, San Francisco, Cal. Filed Nov. 12, 1883.

293,846. DEVICE FOR ARRESTING LOCOMOTIVES AND CARS: Maximilian F. Bonzano, Philadelphia, Pa. Filed Nov. 21, 1883.

293,899. CAR-COUPLING: John Martin, Knight's Ferry, Cal. Filed Nov. 12, 1883.

293,967. CAR-VENTILATOR: Owen H. Jones, Hartford, Conn., assignor of one-half to Frank C. Smith. New York, N. Y. Filed May 14, 1883.

293,993. ELECTRO-MAGNETIC CAR-BRAKE: Jas. E. Withers, Henderson, Ky., assignor to Robert A. Holloway, same place. Filed Nov. 21, 1883.

293,995. CAR-COUPLING: Frederick M. Wright, Fern Ridge, Mo. Filed Nov. 16, 1883.

BEARING DATE FEBRUARY 26, 1884.

293,996. CAR-REPLACER: Robert E. Alexander, Niagara, Pa. Filed May 12, 1883.

294,016. CAR-VENTILATOR: William E. Cowen, Defiance, Ohio. Filed Oct. 9, 1882. Renewed Aug. 15, 1883.

294,030. RAILWAY-SIGNAL: Oscar Gassett, Boston, Mass., assignor to the Union Switch and Signal Company, Pittsburgh, Pa. Filed June 6, 1883.

294,053. METHOD OF AND DIE FOR FORMING RAIL-JOINTS: Francis Lightfoot. Media, Pa. Filed May 12, 1883.

294,084. SNOW-CLEARER FOR TRACKS, ETC.: Louis Schulze, Philadelphia, Pa., assignor of one-half to William Briscoe, same place. Filed March 20, 1883.

294,090. CAR-WHEEL: Frederick H. Smith, Baltimore, Md. Filed Aug. 8, 1883.

294,100. SWITCH-STAND: Fredric C. Weir, Cincinnati, Ohio. Filed Feb. 12, 1883.

294,101. RAILWAY-RAIL JOINT: Fredric C. Weir, Cincinnati, Ohio. Filed Feb. 12, 1883.

294,116. RAILWAY-SIGNAL: Bert Buys, Reese, Mich., assignor of one-third to Frank Wilcox, same place. Filed Nov. 3, 1883.

294,124. CAR-COUPLING: Edward L. Granger, South Manchester, Conn., assignor, by mesne assignments, to the Granger Automatic Car-Coupling Company, of New York. Filed Feb. 26, 1883.

294,126. TRACK OR ROAD-BED: Seth Griffin, New York, N. Y., assignor of one-half to William Halkyard, Providence, R. I. Filed Oct. 15, 1883.

294,127. CAR-COUPLING: Daniel Ambrose Grounds and James Rambo Gibson, Hope, Ark. Filed Dec. 13, 1883.

294,140. CAR-TRUCK: James E. Mason, Blanchard, Pa. Filed Dec. 26, 1883.

294,166. METALLIC RAILOAD-TIE: Charles H. Van Orden, Catskill, N. Y. Filed Aug. 23, 1883.

294,172. RAILWAY GATE AND SIGNAL: Henry F. Wight, Boston, and Hosea P. Aldrich, Somerville, assignors of one-half to Samuel N. Aldrich, Marlboro, Mass. Filed Dec. 8, 1883.

294,191. RAILROAD-TIE: Thos. Breen, Knowlton, Pa. Filed May 25, 1883.

294,206. RAILWAY-SIGNALING APPARATUS: Wm. N. Dawson, Adel, Iowa. Filed June 14, 1883.

294,207. ALARM-SIGNAL FOR RAILROAD CROSSINGS: John B. Deeds and Joseph H. Blake, Terre Haute, Ind.; said Deeds assignor to said Blake. Filed April 7, 1883.

294,209. REFRIGERATING APPARATUS FOR CARS, ETC. Wm. H. Doughty, New York, N. Y. Filed Oct. 22, 1883.

294,245. RAILROAD-RAIL: Francis Lightfoot, Media, Pa. Filed Oct. 19, 1883.

294,252. LOCOMOTIVE: Alexander Mitchell, Wilkesbarre, Pa. Filed July 31, 1883.

294,266. CAR-COUPLING: Hiram Pidcock, Burlington Junction, Mo. Filed Nov. 28, 1883.

294,306. CAR-BRAKE: William Brumble, Baltimore, Md. Filed Jan. 19, 1884.

294,331. SLEEPING-CAR: Thomas Clarke, Truro, Nova Scotia, Canada, William H. Paulding, Peekskill, and George Reinl, New York, N. Y. Filed June 29, 1882.

The Rote Automatic Brake.

THIS brake belongs to the class of compression brakes, the brakes being applied by the compression of the draw bar, when the speed of the engine is checked. A simple device, controlled by the speed of movement of the car automatically regulates or controls the brake-setting mechanism, rendering the latter operative or inoperative as occasion requires. The brake mechanism is inoperative while the car is at rest, but becomes automatically locked in operative position by the movement of the car when the latter is being drawn, and is ready to be applied when needed, as soon as a speed of about two miles per hour is reached. After the car has been at speed and the brakes are applied, they hold until just before a complete stop is reached, when they are automatically released, and the train is free to be immediately backed without first taking up the slack. The train does not move more than four or five yards after the brakes are thus automatically released, yet they are infallibly released before a complete stop is reached. The speed of the train may be restored at any time at the will of the engineer, the simple act of pulling out freeing the brakes. There is no obstacle or hindrance to pushing or backing a car or train at any rate of speed.

George B. Trout, engineer Strasburg Railroad, Strasburg, Pennsylvania, has made a statement as to how the Rote Automatic Independent Car Brake worked while it was under his supervision on the Strasburg Railroad.

The following are extracts from his published statement:

"We experimented five days with the Rote Brake, and it gave entire satisfaction in every respect during the whole time. We tried the brake the second day on a grade of seventy feet to the mile, at the rate of twenty miles an hour. The train consisted of the engine, an empty gondola flat car, equipped with the Rote Brake, and placed next to the engine, with two loaded freight cars and a passenger car behind. By shutting off steam and applying the hand brake to the engine (we had no air or steam driver brake) we made several complete stops in from fourteen to twenty seconds. The brakes on the passenger car and the two loaded freight cars were not used, so the Rote Brake on the empty gondola car had no help from them. We tried this several times, always with equally good results. The Brake gave more than satisfaction in every respect, never balking once in the five days we used it. I think the day is not far distant when a train will not be considered properly equipped without the Rote Brake."

Two New Clayton Pumps.

TWO new pumps have been added to the large variety manufactured at the Clayton Steam Pump Works, Nos. 45 and 47 York street, Brooklyn.

One is a new hand pump giving a high pressure of air for experimental purposes. This pressure, of from fifty to three hundred pounds, is produced either by hand or belt power. A public need is met by this successful invention, for which a large demand is assured.

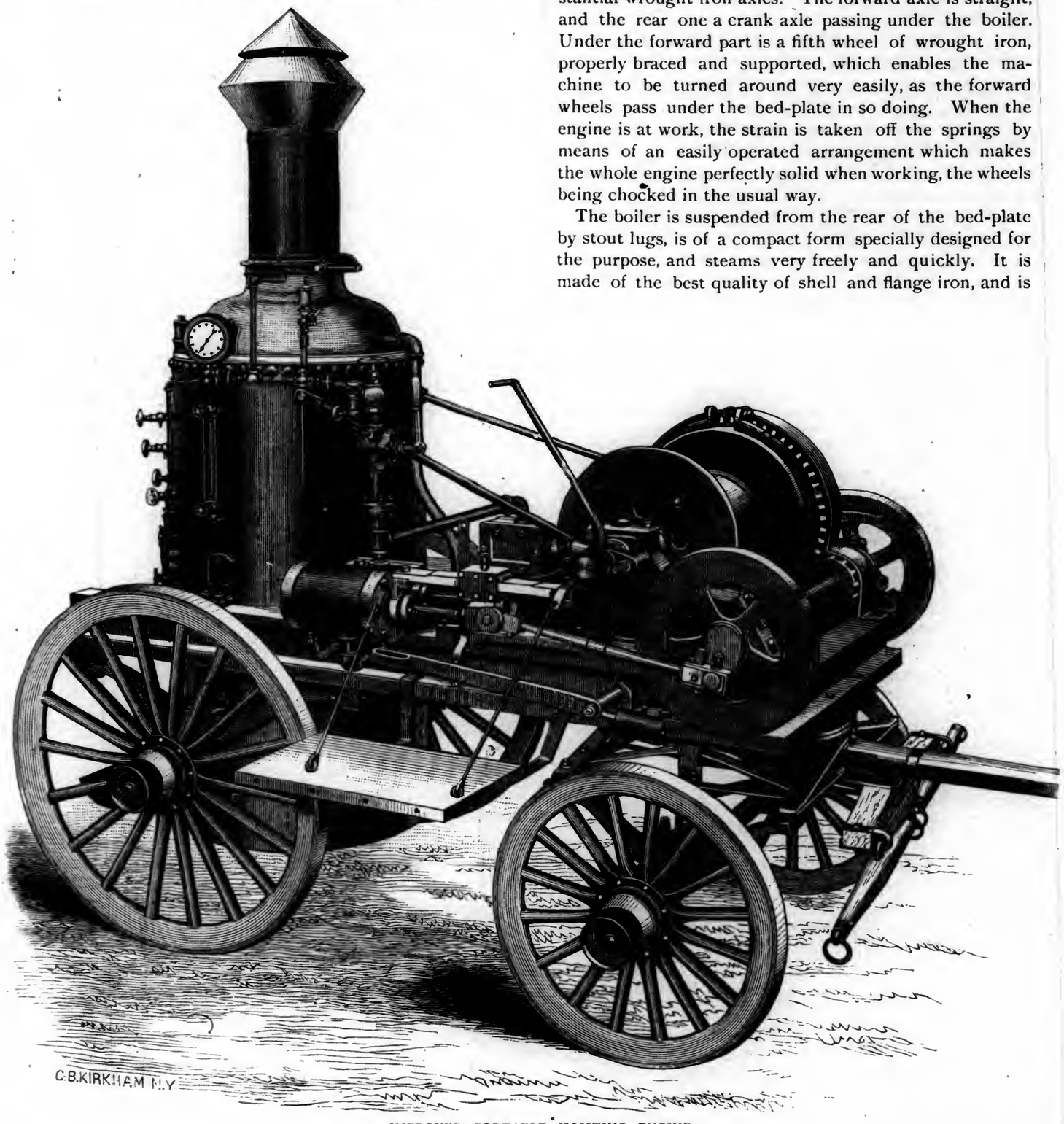
The new ammonia pump for refrigerating purposes exactly answers to the requirements of fruit stores, breweries, etc., where a moderate degree of cold is desired; and is produced opportunely for the approaching hot season. It is a double-action pump, possessing, of course, double the efficiency of a single-action pump.

INFORMATION of value to needy inventors can be procured from the Humanitarian Invention Association, No. 13 Central Square, Youngstown, Ohio.

IN a recent British invention two or more indicator cylinders are fitted to one drum or roller for the purpose of taking the simultaneous diagrams of the boiler pressure, cylinder pressure, cylinder vacuum and condenser vacuum, and by using pencils of different colors, such diagrams can be distinctly read.

Improved Portable Hoisting Engine.

THE Lidgerwood Manufacturing Company, No. 96 Liberty street, New York, are building the Improved Portable Hoisting Engine. It is designed to meet all the requirements of a portable hoisting engine, namely, a frequent change of position over all kinds of roads, and the same to be done without damage to the engine or boiler by jolting and jarring. A want is thus met which railroad companies will be among the first to hail with satisfaction.



IMPROVED PORTABLE HOISTING ENGINE.

The hoisting engine is of the double cylinder, patent friction drum type, and is mounted upon a heavy, substantial bed-plate, faced off to receive cylinders, standards, etc. To this bed-plate are attached the springs, which are the same style as used on the heaviest trucks, and are made of the best quality of steel. These bear on substantial wrought iron axles. The forward axle is straight, and the rear one a crank axle passing under the boiler. Under the forward part is a fifth wheel of wrought iron, properly braced and supported, which enables the machine to be turned around very easily, as the forward wheels pass under the bed-plate in so doing. When the engine is at work, the strain is taken off the springs by means of an easily operated arrangement which makes the whole engine perfectly solid when working, the wheels being chocked in the usual way.

The boiler is suspended from the rear of the bed-plate by stout lugs, is of a compact form specially designed for the purpose, and steams very freely and quickly. It is made of the best quality of shell and flange iron, and is supplied with all fittings complete. On the top of the boiler is a substantial cast iron dome or bonnet, with a hinged smoke stack, which can be lowered for transportation, and which is supplied with a spark arrester. This boiler in dimensions, has been specially designed by the

company to steam quickly and freely, with the least possible expenditure of fuel. All of the fittings used on the boiler are manufactured by the company on special tools, and are of superior quality.

The hoisting engine is fitted with the patent friction drum, made by the Lidgerwood Manufacturing Company, with a powerful foot brake. This drum is well-known to be a decided improvement, far superior to the old clutch engine for every kind of hoisting duty. It is much quicker to manage and handle, thereby doubling the amount of work accomplished, as well as doing it much more satisfactorily. It will also outwear any clutch engine, at least two to one, and does not get out of order. The friction is composed of iron and wood, the wood being of the hardest kind, placed endwise of the grain to the wear, and will last for years with all kinds of hard duty.

In operating the engine, the man stands on the foot board, as shown on the engraving. This foot board, when the engine is being moved around, is turned up on its side out of the way. The seat for the driver rests on the drum of the engine.

The wheels, axles, springs, and the whole running gear are of extra quality, and the facility with which the new engine can be transported over the country, either on rough roads or pavements, and its special adaptability for all railroads, contractors, and bridge builders, who need an engine adapted for all general hoisting and pile-driving purposes, give its introduction great importance. It was designed on purpose to meet the requirements of railroads and bridge builders, and for dock purposes where the engine has to be transferred from one dock to another.

If required, the manufacturers furnish a compact and substantial house covering the whole machine except the wheels. It has sliding doors on all sides, and is specially adapted for the engine.

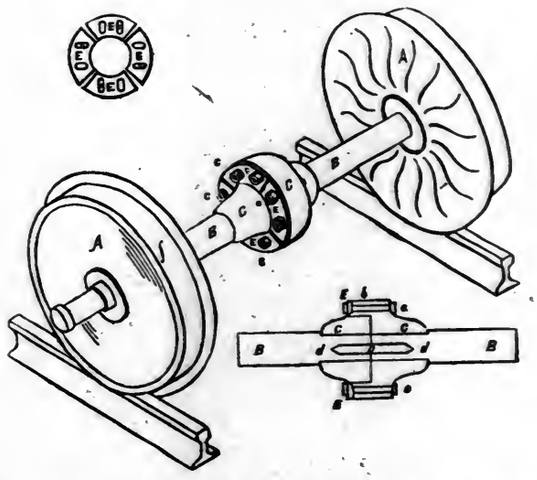
The first three of the Improved Portable Hoisting Engines are at work on the docks of Messrs. Constantine & Co., of New York, the fourth one is in the city of Boston, the fifth one is in the shops of the company, and the sixth one is at work in the city of Newton, Massachusetts.

Every part is made to gauge and templet, and is carried in stock by the company, so that in case of any wear or breakage, parts can be supplied without delay.

The Tompkins Automatic Car Coupler.

THIS consists of the common form of wrought or cast draw-heads, and two springs that fasten to the bottom of the same by one sprink keg. These pass along the bottom of the draw-head about five inches, thence upward through slats in the upper and lower walls of the draw-head, and at the top curve together to catch the head of the pin when it is raised. The link entering the draw-head spreads the springs and releases the pin. The springs being more rigid at the bottom than at the top, press the link up as they hold it and make it sure to enter the opposite draw-head. With a straight link it is sure to couple where the draw-heads do not vary more than three and one-half inches in height, and a crooked link can be used equally well and will automatically couple those varying more. A housing or cap forms a guide for the pin and a protection from storms. The pin can be raised while a link is in place and will stay there, which is very necessary in doing yard work; but when the cars are moved apart it readily adjusts itself to drop as the next link enters, the removing of the link adjusting it. It can be uncoupled either from the top by a chain or from either side by a lever, or more simply by taking hold of the pin as in the common draw-head. The cost is but little more than the common couplings. The Tompkins coupler is used by the Adirondack Railway Company, and is strongly recommended by that corporation. Correspondence is solicited by D. McMurray, Fort Edward, New York.

The Bedbury Car-Axle.



IT is an admitted fact that the friction on curves is produced by the wheel on the upper rail having to slide a certain distance on the rail. As the outer rail on a curve must necessarily be of a longer distance than the inner one, it certainly follows that the outer wheel has more revolutions to make, which cannot be done on a rigid axle; so it is plain to see the advantages of this axle. Again, this axle prevents jumping the rail on curves. The inventor claims that the cause of jumping the rail is the sliding of the wheel on the upper rail—that is, in many instances. With this axle, many of those accidents are obviated; and the claim is made that this axle removes from eighty to ninety per cent. of the friction now produced on the curves, thus saving fuel and wear of locomotive. The joint for the division of the axle is as near dust-proof as can be for such a purpose. The holes for lubricating, the cut does not show; for that purpose a hole is made in each quarter, from the surface to the center, with a screw plug, thereby keeping it dust-proof. It requires lubricating but about once in three months, as it has so few revolutions to perform. Again, all the axles now in use can be remodeled to this form at a small expense, which can not be said of any other axle for this purpose. This axle is provided for taking up all the wear that may be produced, as it will be observed that the flange which holds the axle together is beveled on the inner side, and fitting on a reverse bevel on the casting. The flange (or collar) is in three or four pieces, with slotted bolt-holes, and by loosening up the bolts, and pressing the flange in, a perfect fit is obtained. The manufacturers will permit any corporation to test it, and will send a competent man to superintend its construction, or full detail drawings, as they may direct.

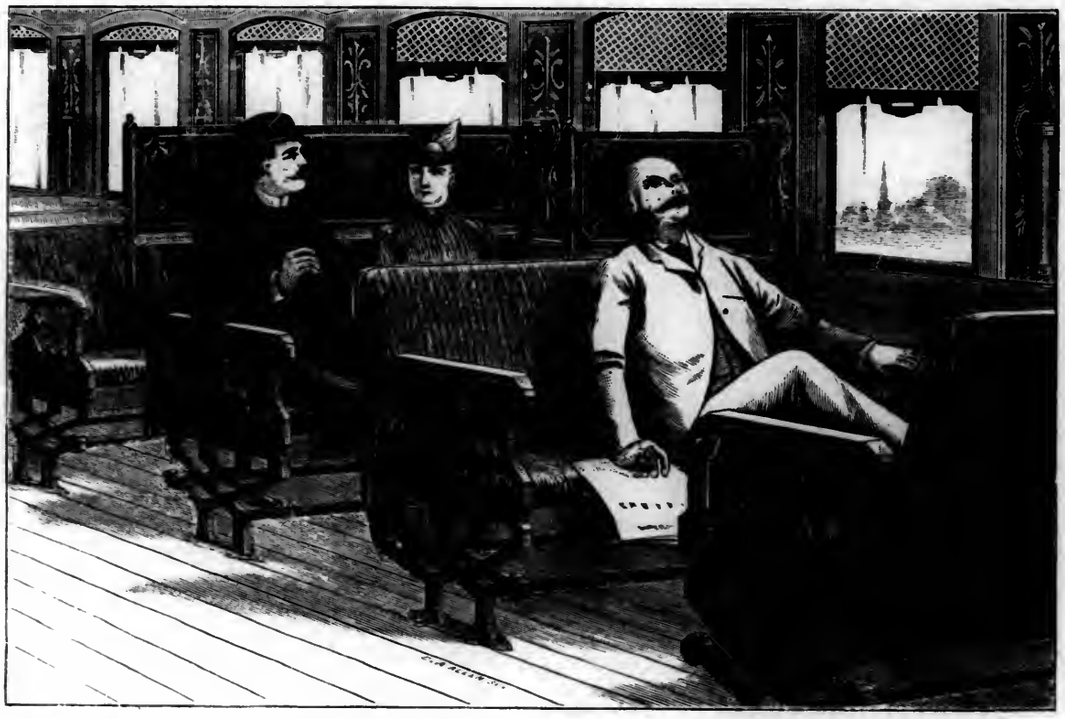
For any further particulars, address the Bedbury Car-Axle Company, Portland, Oregon.

Osgood's Improvement in Railway Passenger Cars.

THE engraving partially represents the improvement in passenger cars, invented and patented by E. P. Osgood, No. 156 Hanover street, Boston.

It consists of a flexible curtain, rolling automatically, and pulling out from the side of the car, and on line with the back of the car seat. It can be applied to any passenger car, and be easily adjusted and firmly held in position, forming a partial seclusion and also a comfortable head-rest to the occupant. In traveling many hours, and on weary journeys, it would serve as a comfortable rest by day, and at night oftentimes enable the traveler to dispense with a sleeping-berth. Draughts from open windows in front or rear can be avoided without troubling others. Conversation may be carried on with a friend, or lunch taken without attracting attention. The improvement is useful and ornamental, and something every traveler would appreciate.

Mr. Osgood will answer inquiries.



OSGOOD'S IMPROVEMENT IN RAILWAY PASSENGER CARS.

The Garton Snow Plow.

THIS newly-patented invention is similar in shape to the ordinary plow, but flatter at the point, where it enters the snow. It is furnished with a steel flange on each side and one in the center, of any width necessary, from one foot upwards.

All the flanges at the front enter the snow on the perpendicular, but those on the outside lean over until at the back end, they show themselves a little above the level or horizontal line. The center flange preserves its perpendicular about two-thirds of its length, where it branches off into two flanges, and, forming curves towards the outer edge in order to throw the snow, clears the track. The face of the plow forms a sort of mold-board, flat where it enters the snow, but gently rising in the center, and forming quite a ridge, increasing in height till it reaches the top of the said ridge.

The patentee claims that the center board with its curves or mold-boards, as above described, will throw the snow clear out of the way. He believes that it excels all other snow plows, from the fact that instead of pushing the snow in front and on each side, and with the power of an engine pressing it into a solid mass almost equal to ice, its sharp edge enters the snow gently, with such ease that it rises and makes its escape from the top, just in proportion to the speed of the train. This is all done without pressure or force, and with little or no hindrance to the train. Mr. Garton is perfectly satisfied that a train at Albany, with his plow in front, would run from thence to Buffalo, through snow four feet deep, the whole distance without delay, representing a value of one thousand dollars per day,

A great merit of Mr. Garton's plow is its simplicity. Moreover it is cheap, its very probable efficiency being regarded. To further its introduction, the inventor is prepared to deal liberally with any person who will start the first plow. Prominent Canadian railroad men are interesting themselves in the device, which is patented in the Dominion as well as in the United States.

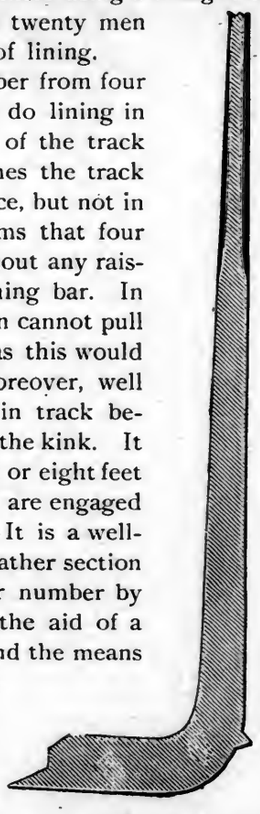
David B. Garton, Barrie, Ontario, Canada, is patentee of the snow plow named after him.

A NEW cross tie, on which United States letters patent have been granted, consists of a vertical web, bottom flange, and top flange or head. The top flange or head is provided, adjoining the web, with vertical perforations to receive the legs of staples provided on their upper inner sides with flanges, for the purpose of holding the rails and keys.



Noonan's Railway Lining Bar.

THIS invention of B. J. Noonan, Fern Ridge, Missouri, consists of an iron hand bar, as shown in the engraving. It is especially adapted to lining purposes where section gangs number only three or four men. In this case the lining bar is reported to have a capacity of ten men itself, and two men using it, and two others using a straight bar opposite it, can line track that twenty men could not move in the old style of lining.



Section gangs generally number from four to six men, and are unable to do lining in many instances, as in the case of the track being filled in heavy. Oftentimes the track may be level and in good surface, but not in good line. The inventor claims that four men can do all this lining without any raising or surfacing, by using his lining bar. In "gumbo" regions, where six men cannot pull a line to rail, such an appliance as this would be of great service. It is, moreover, well adapted to lining kinked rails in track because it provides a direct pull on the kink. It does not cover the space of six or eight feet as required where a dozen men are engaged in lining up a piece of track. It is a well-known fact that during warm weather section gangs are always short of their number by one or two laying off. Now, by the aid of a lining bar there is always on hand the means to do any lining required, no matter how heavy the track may be, or how badly it may be buried down in the ballast. In using it the workmen should see that there is no material at the ends of the ties in the direction they wish to move the track. This is necessary in order not to injure the smoothness of the track in its new line. The lining bar can be had for a small cost. Every section on the different roads has old claw bars and pinch bars lying around in hand-car houses, which by a little alteration at the machine shop would make a good patent lining bar and save the cost of new material.

New Reversible Valve Gear for Steam Engines.

NEW reversible valve gear for steam engines has been invented and patented by William B. Turman, of Waldron, Scott County, Arkansas. It consists of two eccentrics on the main shaft of the engine, one of which is set to run the engine forward, and the other set to run the engine backward. Each of these eccentrics gives the motion to a separate slide, a little way apart from each other, and having a notch in their top side. They are situated between the main shaft and the cylinder, and are held in position by slide ways fastened to the bed plate of the engine. Between the notches in said slides and the main shaft, and betwixt the slides is a bracket, through which passes the end of a connecting rod, which has two wrist pins. These are set in proper position to engage, one at a time, in the notches in said slides, and are set at right angles to the rod, at such an angle to each other that when one is in the notch in one of its slides, the other is out of notch in the other slide; and, by rocking the rod over the wrist pin will be thrown into the other slide notch, thus giving the rod a motion to run the engine in an opposite direction to that given by the first position of the rod. Said rod is rocked or turned so as to engage one and disengage the other wrist pin, by means of a sleeve to which a lever is attached. This sleeve is held in place between two brackets fastened to the bed-plate of the engine, and through which sleeve said rod passes. The rod conveys motion to the rock shaft from one of the eccentrics, and by rocking it over with said sleeve and bringing the other one of its wrist pins into the notch of the other slide, it gives motion from the other eccentric to the rock shaft. Moreover, the rod is attached to the rock shaft in such a manner that it may partly turn over to allow its wrist pins to engage alternately in slide notches as before described; or, instead of using a rock shaft, the connecting rod may be jointed to the end of the valve stem by means of a small cross-head. The wrist pins on the rod are kept from being turned out of the notch of either slide, while in the middle of their travel, by a curved bar projecting over the middle of the travel of said notches and close to them, thereby preventing the rod being turned and the engine being reversed, while the valve is in the position to prevent the steam escaping from the cylinder, so that no injury can by done by the compression of the steam in the cylinder by the momentum of the engine.

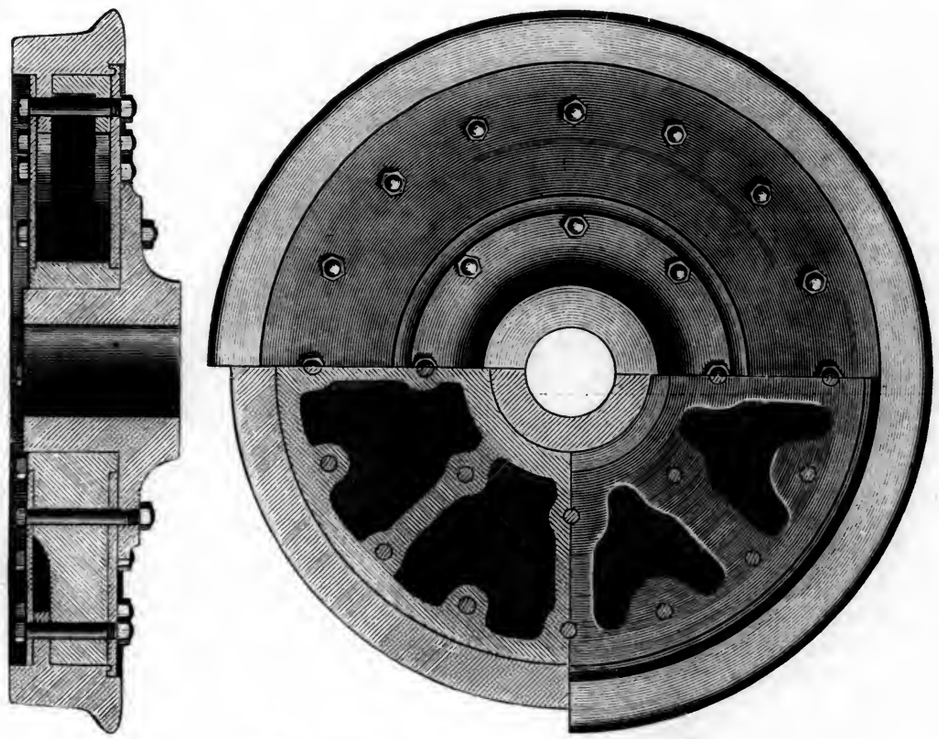
The essential parts of the invention consist of two eccentries and a connecting rod with two wrist pins, by which the motion of either of the eccentries may be used on the valve, by the operation of simply turning the connecting rod partly over by the attendant.

The inventor claims that this arrangement is the cheapest, most perfect working and most easily handled reversing gear for steam engines yet devised. He invites correspondence, which will be promptly answered.

Snow's Patent Steel Tired Metal Wheel.

W. W. SNOW, general manager of the Ramapo Wheel and Foundry Company, Ramapo, New York, is patentee of the invention described and illustrated below.

Its merits stated briefly are: The internal flange to the tire, presents the best form for strength, with the lowest amount in weight of steel which can be devised. The recess in the back of the tire, and corresponding recess in the back plate, form what may be termed a "retaining ring," so that in case of a portion of the tire breaking, this recess in the tire and plate with the front plate bolts and "retaining ring" will effectually hold the parts firmly together. This tire can be removed without taking the body of the wheel apart.



SNOW'S PATENT STEEL TIRED METAL WHEEL.

The independent hub is a very important feature in the construction and utility of this wheel, as shown when sent to the shop for re-turning. It is there found that many tires on one end of the axle, are badly worn in the flange, while the other tire being the hardest, is but slightly worn. In order to get another good flange, it is necessary to turn off from three-eighths to three-fourths of an inch from the soft tire, while the opposite tire may require but a small amount to true it up. With the Snow wheels, in contrast, the hubs being interchangeable, the hub is pressed out from the body of the wheel, instead of removing it from the axle, and the wheels requiring the same amouut of turning are re-applied together; thus saving a large amount of steel lost in the usual way of re-turning, besides placing tires of the same grade of steel together, and producing more uniformity of service on their second application. The axles also being fitted at different shops, have a greater or less diameter in the wheel fit. The independent hubs being all carefully fitted at one shop, to the reamed central filling piece, provides for this interchange of hubs, without any mistake as to their interchangeability, simply by removing the nuts from the bolts in the flange, and without taking the wheel apart. This subject will soon be one of great importance to railroads, in the matter of utilizing their old axles, as they will find in their complications of refitting, there are often cases where the axle may not have given half the service required; yet the hub seat being a little small for the wheel, requires this change to utilize the old axle. It will be readily seen that either the tire or the hub can be removed separately from the body of the wheel, and re-applied with new, in any ordinary machine shop, without taking the wheel apart. The Snow device has but one plain surface presenting itself to the hub of the wheel, to endanger its successful movement in or out of the filling piece, as both back and front plates are not allowed to reach to the bearing surface of the hub. This feature is entirely new, not having been used or patented heretofore.

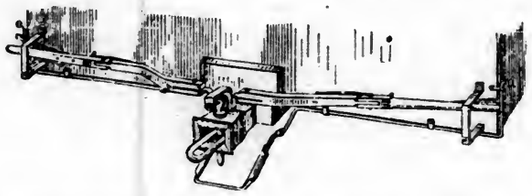
The advantages of the iron "central filling piece" will be observed as an important support to the tire, as wrought iron plates have a tendency to wear their edges, when the tire is expanded by the action of the brakes. The bolts also through the filling piece, and internal flange of the tire, hold the tire firmly in position when expanded by the action of the brakes.

The economy of re-applying new tire and hubs to the wheel, will be apparent from the fact, that it can be done in any ordinary machine shop, and all work in an ordinary boring mill and press, at a trifling cost above the ordinary cost of refitting an iron wheel; and all parts of this wheel will always retain their original value, except the tire when worn out.

CERTAIN portions, in some proposed foreign railway carriages, are in detachable parts, which may be rapidly put together or taken to pieces without skilled labor, the object being to get sleeping space without increase of size.

The McLeod Car Coupling.

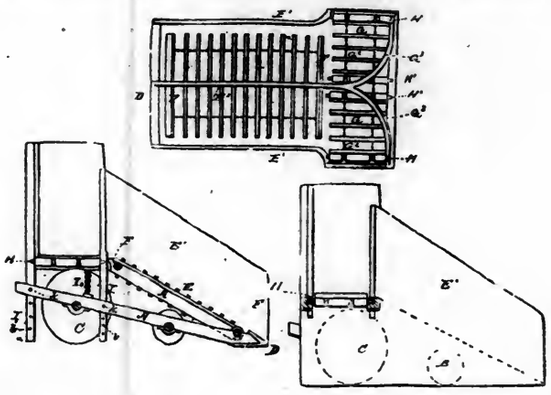
JOHN K. MCLEOD, London, Ontario, who has been granted letters patent on his coupling in both Canada and the United States, claims for it, that it will couple and un-



couple without the danger of going between the cars, and that it can be coupled on to any cars which can be coupled by hand. The levers on the end of the car raise the pin on either side. A spring latch is provided to fasten the lever down if it is required to do so. A small lap on the top of the lever will let the pin down on the bottom of the car. A rod extends from side to side, with a crank centrally located, and by moving the crank on the side of the car the crank will lift the link as high as required; and when let go will fall down out of the way. If it should get caught in the approaching draw-head, the compressed spring will allow it to move with the draw-head when it opens, and will fall down the same. The coupling-pin moves on a rod so that the longitudinal movement of the draw-head has no strain on the levers. The inventor says his coupling has been examined by hundreds of practical railway men of both Canada and the United States and is approved by them.

Menze's Patent Snow Remover.

THIS is an invention of Friedrich W. Menze, Bay City, Michigan, and is patented in the United States and Canada. It is a snow plow attached to the front of an engine, and is provided with inclined movable slats, whereby the



snow is delivered upon laterally-moving slat platforms, which divert it to each side of the track. The snow plow is adjustable, so as to be raised or lowered to suit high or low snow falls. The forward movement of the plow into the snow causes the action of the movable slat carriers.

The claim, illustrated herewith, reads as follows:

1. The frame-work A A, adjustable by means of the perforations K K, *i i*, and pins or bolts, and screw L, and provided with the wheels B and C, and the cutter D, all combined, arranged, and operating substantially as described.

2. In a snow plow, the combination of the frame-work A A, provided with the wheels B and C, cutter D, and adjusting screw L, with the slatted endless apron E, rollers F F′, and platform G, all as hereinbefore shown and described.

3. As a snow-removing attachment to a locomotive or railway engine, the combination of the frame-work A A, wheels B C, cutter D, aprons E G^2, screw L, and shafts F F′ H H′, constructed as hereinbefore set forth.

4. In a snow plow, the combination of the frame-work A, provided with wheels B C, cutter-edge D, side walls E′, central wall E^2, with the inclined apron E, curved rear wall G^3, and the lateral delivery aprons or carriers G^2, all as shown and described.

5. In a snow plow, the combination of the frame-work A A, inclined carrier E, rollers F F′, curved rear wall G^3, delivering aprons G^2, and rollers H H′, all as hereinbefore described.

Mr. Menze invites correspondence from persons interested in introducing a snow plow.

Another New Sleeping Car.

AN improvement in sleeping cars has recently been made and patented, both in this country and Canada, by Dr. S. S. Black, at present of Los Angeles, California.

The inventor seeing the need of greater accommodation on night trains, and the distress a large portion of the traveling public endure when compelled to journey by night, set himself to work to provide a means by which every traveler on a railroad train can secure a comfortable night's rest. This has certainly long been a desideratum.

A proper thing for railroad companies to do, would be to provide means for all their patrons to be comfortable at night, just as any steamboat company is supposed to do. Dr. Black's invention provides a method whereby this requirement can be fulfilled without the expenditure of any considerable amount of money. It is applicable to any first class car by reseating the same, and costs from seven to ten dollars per seat more than the ordinary first class car seat.

The following is a description of this improvement: Each seat is of the usual height, length and breadth, and distance from the adjoining one. The back is an inch or two higher than the average back, which adds much to its comfortableness, and is upholstered with what is known as a spring-edge cushion, in the same fashion as the seat cushions. Five seats may be called a section, and this section is made up into three sleeping berths, two lower and one upper, the latter being only about three feet from the floor. The upper one is formed from the backs of the three central seats of the section. The center one is turned up until it is horizontal, where it locks automatically. It is hung between the knocker bars on axes, and secured by lock bolts. These are withdrawn and the back rotated on its axis, bringing the soft or cushioned side upward. The two adjoining backs are thus operated in the same way, but are made to incline toward and rest against the central one, thus forming a berth six feet four inches long. A bolster or head cushion is kept under the cushion of the central seat for this top berth. The foot of each lower berth is under the middle of the upper berth, where they are separated by a small panel. The seats, except the central one of the five, are provided with under cushions hinged to the upper ones, which are the broader.

The upper one is lifted by a lug and drawn forward, and made to fill the gap between the seats, where it is securely held. The head cushion is slightly inclined upward, making a comfortable lounge. Roller curtains are dropped from the top of the car to the ends of the top berth, and between the heads of the lower berths if desirable. No step ladder is needed.

Of course passengers would not expect to disrobe entirely, in this car, but they could stretch themselves to their full length and rest, as each bed is a little over six feet long, and perfectly comfortable, the upper part of the car being open and free for the circulation of air.

The great advantages of this car are, that it has little or no extra weight; little extra cost (from three to five hundred dollars per car) above an ordinary passenger coach; it is not top-heavy; has full seating capacity for day travel and as large sleeping accommodation as is likely ever to be called for. Six can sleep where ten, if every available seat were taken, could sit; but as a matter of fact the proportion of night travel is never greater than this. In leaving large towns in the evening, trains are usually overfull, but by bedtime a large portion have stopped off, so that the remainder would seldom be too great to be accommodated, each with a chance to lie down if so desired, and if any two of a party of six wish to sit up, they can do so without depriving the other four of rest.

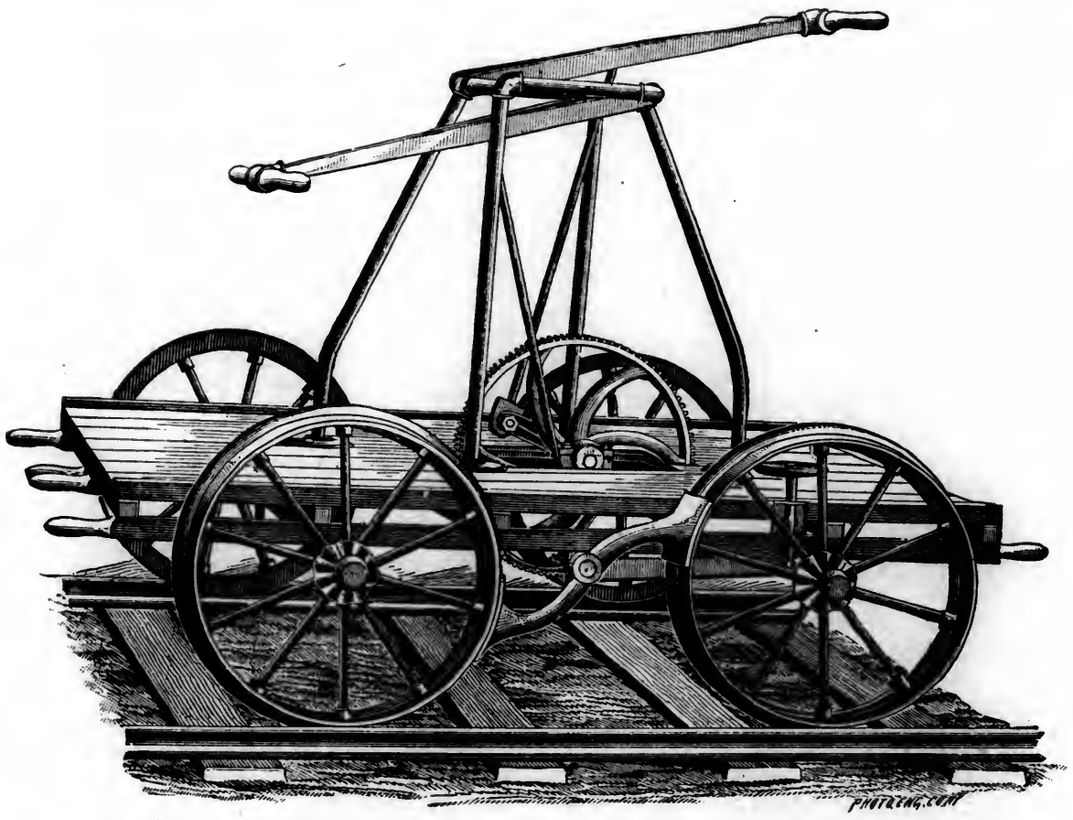
This car would be especially useful to branch roads, and others which are not already supplied with the ordinary sleepers.

THE Old Colony Railroad is seeking leave from the Massachusetts legislature to double track its road.

Improvement in Hand Cars.

THE Kalamazoo Hand Car, although recently patented, has been thoroughly tested by competent railroad men for six months, and is very favorably regarded by them.

The peculiar construction of the cranks of the car, these being set obliquely to each other, does away with dead centers, and perfectly economizes the power used. The trussed levers passing each other to their pivots, apply their power to both sides of the spur gear, thereby securing additional leverage believed to be unattainable in a hand car otherwise constructed. The gas-pipe frame or standard, is light, strong and durable, and occupies but little space. An S-shaped brake works on both wheels at the same time. It is very strong, and is instantaneously operated by simply stepping on the pedal.



THE KALAMAZOO HAND CAR.

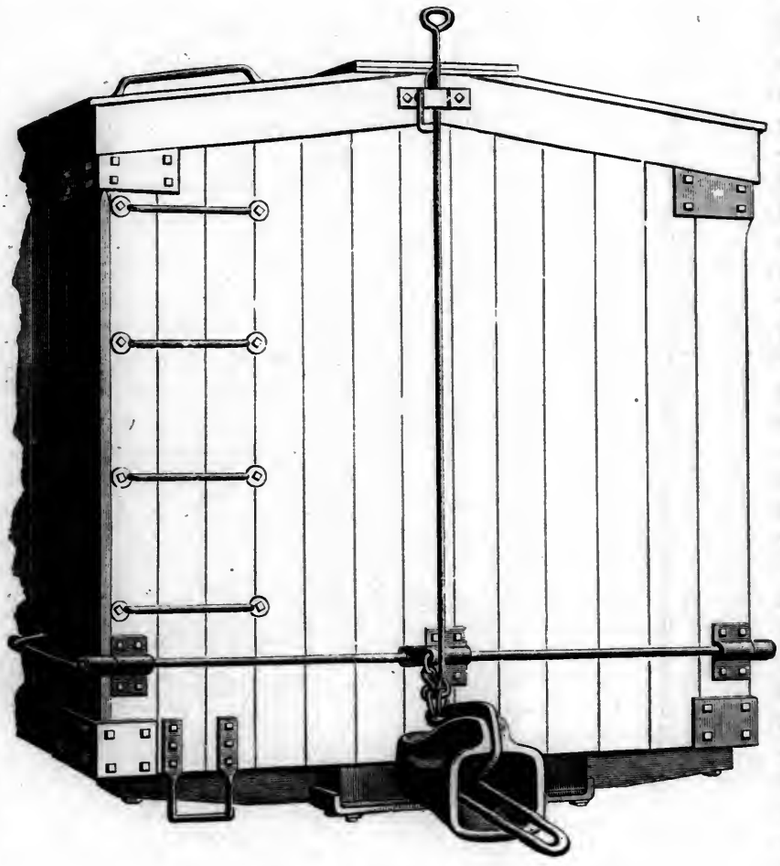
For further particulars address the Kalamazoo Railroad Velocipede Company, Kalamazoo, Michigan; or Alfred Heyn, agent for New York city.

THE stockholders of the Schuylkill Navigation Company, which is controlled by the Philadelphia and Reading, held their annual meeting February 12. The annual report shows that the balance to the credit of the general income account at the beginning of the past year was $91,305. The income for the year was $639,976, of which $635,776 was rent payable by the Philadelphia and Reading Railroad, and $4,199 interest and discount received. The interest paid on loans, dividends, State tax, discount on loans sold, and office expenses amounted to $644,355, leaving a balance to the credit of the general income on January 1, 1884, of $86,926.

The Union Car Coupler.

OUR illustration shows the car coupler invented by Pierre E. Mignault and Peter Dion, and manufactured by the Union Car Coupler Company, No. 19 Congress street, Boston. It has a special claim to notice in that it is now in use, having been adopted by the Eastern Railroad Company after several months of severe and constant service, and is giving entire satisfaction. The superintendent of the Eastern Railroad Car Shops says "it has never once missed making a connection under any circumstances." As by its means, a train can be made up in half the usual time, both time and engine power are saved very considerably by its introduction.

The Union Coupler is inexpensive because simple in its mechanism. It is automatic, and can be uncoupled from either the side or the top of the car, thus insuring absolute safety to all employés. It is compact, very strong, not liable to get out of order, uses no springs or pins, has no parts to become lost, and works perfectly in connection with the coupler now in common use on all freight cars. Full particulars may be had at the office of the manufacturers, where the coupler may be seen, and its operation is shown.



THE UNION CAR COUPLER.

Carpenter's Boring Machine.

THIS machine is a new departure in all its arrangements, and is believed to be quite an improvement over every other kind. Instead of the old wooden upright frame, it is built of steel, with steel braces. The upright rods (one-half inch in diameter) pass through the auger gate, which slides up and down on them, and can by no possibility fly the track. By the half turn of a set-screw the frame can be adjusted so that the auger will bore at any desired angle. When the right depth is reached, the auger comes to a full stop; the next turn in the same direction loosens the screw; then it falls into gear, and is drawn out of the hole without changing the motion. When the gate is drawn up it catches on a pin and is firmly held, but when drawn a little higher it leaves the pin and descends to its work. The machine goes through all these paces without the operator taking his hand off the cranks. The cranks may be lengthened or shortened at pleasure, so as to give any desired speed. This machine works very fast and is exceedingly durable. The gears are cut, which is not usual in other machines.

This machine is manufactured by the Millers Falls Company, Millers Falls, Massachusetts; New York office. No. 74 Chambers street.

Harbold's Car Coupling.

THE object of Harbold's Car Coupling is to couple cars of varying heights, and in such a manner that the brakeman cannot be hurt. A movable bar of iron extends across the car beneath the draw-head, terminating at each end with a handle, and fastened to the car by journals on either side. Immediately beneath the draw-head and extending to the end of the same, and fastened to this bar, are two stationary arms. The ends of these arms contain a hole or journal, and through these journals two movable bars slide back and forth, and extend beyond the draw-head from six to eight inches. These are connected by a flat piece of iron, which extends upward to a level with the floor of the draw-head. When the coupling is not in use it hangs beneath the car, and the movable bars are thus extended. When in use, the brakeman stands at the side of the car, out of danger, and by the handles raises the coupling. The flat piece of iron, or link-guide, catches the link of the approaching car; then the coupling is raised until it is stopped by the draw-head underneath, to which it is attached. This brings the link on a level with the car to be coupled. The approaching car pushes back the movable arms, and the link-guide sustains the link in the proper level, and in this manner is guided to the draw-head. When the cars move, the coupling drops to its place beneath the cars.

The patentee of this invention is John E. L. Harbold, Worthington, Jefferson county, Kentucky.

THE Railway Specialty Manufacturing Company, No. 30 Vesey street, New York, is now fully organized, with capital partly paid up; and is in position to take orders for Horner's Safety Switch Stand, described in these columns last month. Arrangements made by the company provide for the manufacture of the stand by other companies, on royalty. The device is already in use on some of the principal lines, and gives entire satisfaction.

THE "New Inventions" department of this journal, a great success, will be better than ever next month.

The Fisher Freight Car Door Lock.

J. HYDE FISHER, No. 50 State street, Chicago, is inventor of the railroad freight car door locks described below.

These locks are rights and lefts, to suit different roads. Those in which the button turns to the right against the door when shut, are called right-hand locks; those to the left are left-hand; they are made with or without extra locks. Those without locks have no hook attached to the button, and are cheaper. Those that have locks have a strong three-tumbler bolt lock, which bolts into a hook on the button. The tumblers and lock-bolt are of brass, the latter being in a position which is not liable to get out of gear by rough usage. There is an inside escutcheon for key-hole, which prevents cinders, snow, etc., from entering the lock. Openings the full width of the button allow room for seal, also for the United States lock for bonded goods. The operation is merely turning the button one way to fasten the door, the other way to allow the door to be opened.

A Superb New Sleeping Car.

THE Harlan and Hollingsworth Company, Wilmington, Delaware, have recently completed a sleeping car for the government of the Argentine Republic, which is one of the finest structures of the kind ever produced. Its frame-work is of iron with channel and eye beams cross blocked with iron tubes; its platform frames are also of iron. Running gear consists of four-wheeled trucks with thirty-six inch Page wheels with steel tires, French's elliptic and coil springs, and the ordinary hand brakes; and the American system of ordinary draw bars of wrought iron is used in coupling. The exterior of the car body is painted in maroon, artistically ornamented in gold cut in with green, black, carmine and other colors; and the lettering is exceedingly beautiful and harmonious with the embellishments. Inside, the car is finished in solid San Domingo mahogany, the raised panels of the old style, of about the sixteenth century. The oak ceilings have solid mahogany mouldings and are ornamented in gold bronze and colors. Light is provided by means of five double light chandeliers of the Adams & Westlake patent, in which olive oil will be consumed. The deck lights have pivoted sash filled with embossed glass and are protected by brass wire cinder screens. Windows have double mahogany sash with plate glass, and are fitted with spring roller curtains. Between them are beveled plate mirrors with plated mirror guards at the base. All metallic trimmings are plated in nickel. The hard wood floors, of maple and cherry, are covered with Wilton carpets of late designs. Throughout the car the seat cushions and backs are upholstered in the finest quality of cherry plush. Heat will be furnished by two small Spear wood burning stoves, one at each end of the car, protected by screens of galvanized iron.

The car is divided into four compartments. One end is occupied by the men's wash room, supplied with a marble-top lavatory, water tank with nickel-plated pump, French plate mirrors and a toilet room. The men's sleeping compartment contains six sections of double berths. Seat ends are of a new and unique design. The upper berths are elaborately finished, the center being a fillet of solid San Domingo mahogany veneer, with a fillet of marqueterie in each end, consisting of a black ground inlaid with brass, white holly and sprigs of laurel. Bulkheads are richly carved, as well as the upper berth rails and dead lights. All the bulkhead doors turn on Union hinges, which allow them to swing either way, and they each contain a panel of richly embossed plate glass. The ladies' compartment contains four sections of the same general style as the men's compartment. Panels in the ventilator sides are inlaid with marqueterie of bunches of pansies with brass borders. The berth curtains are of a rich and heavy material of a dark maroon color, richly embroidered. Mahogany card tables are supplied for each section. The beds are furnished with mattresses, mattress springs, blankets, pillows and all the necessary bed linen marked with the name of the car. Each seat has an upholstered arm rest next the outside of the car and has a pillow box beneath. Ladies' dressing rooms, occupying one end of the car, are provided with lavatory and toilet apartments. The lavatories have marble tops and are supplied by water from a convenient tank by means of a hand pump. Adjoining are the linen locker and other conveniences.

THE Homans Publishing Company, No. 251 Broadway, New York, issued recently "The Banker's Almanac and Register for 1884." This volume (the thirty-fourth year of publication) contains full lists of the National banks, State banks and private bankers of the United States, the president, cashier, and capital of each bank, and the New York correspondents of all; alphabetical lists of cashiers and assistant cashiers in the United States and Territories; the savings banks, trust companies, and safe deposit companies of the United States; the directors of the banks of New York city; the principal stockbrokers of New York city; the banks and bankers of Canada and of the principal cities of Europe, Mexico, Central and South America, the East and West Indies and other countries; a summary of the interest laws, the laws of grace on sight bills, the statutes of Limitation, legal holidays, insolvency, and assignments in each of the States; the number of banks and bankers in each State and Territory of the United States; the pension agents of the United States, their districts, etc.; various statistical tables, and a calendar and timing table for the year 1884. Mr. Benjamin Homans is editor of this invaluable compend of information, which is an indispensable work of reference in many places of business.

AN ingenious advertisement has been issued by the Studebaker Bros. Manufacturing Company, South Bend, Indiana, in the shape of its version of the well-known song, "Wait for the Wagon." It contains words, music for the singer, and an accompaniment for the pianoforte, in a four-paged sheet the first and last pages of which are printed in colors; and includes pictures of the Studebaker Brothers, and a joyful party occupying a Studebaker wagon, making something less than a 2.20 speed over a snow-covered road in a pleasant landscape.

THE Philadelphia city councils, in joint convention, have elected J. Bayard Henry, Edwin A. Gaskill, and Dennis F. Dealy, directors of the Philadelphia and Erie Railroad Company. Elevated railroad schemes in the city named, have received a "set-back."

BROWN BROTHERS & Co.,

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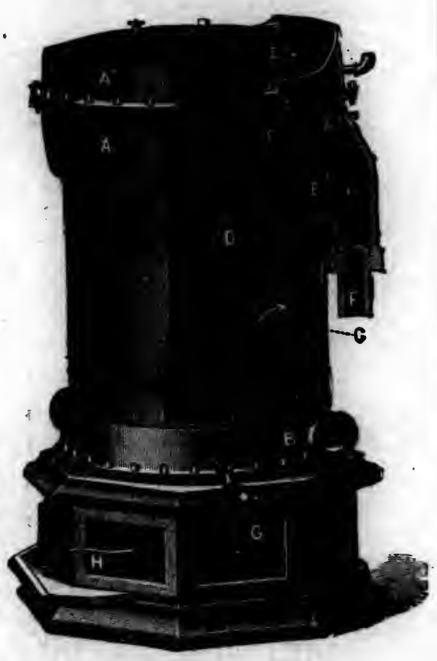
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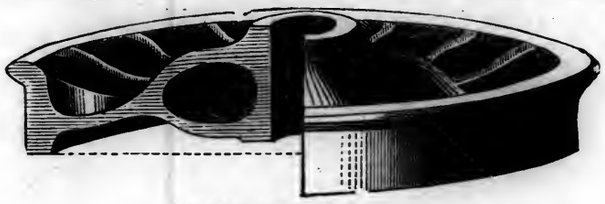
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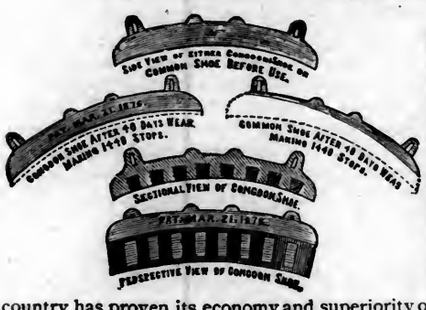
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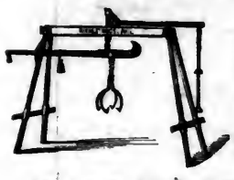
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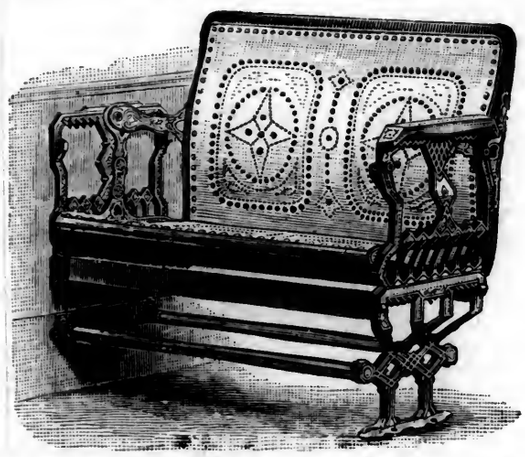
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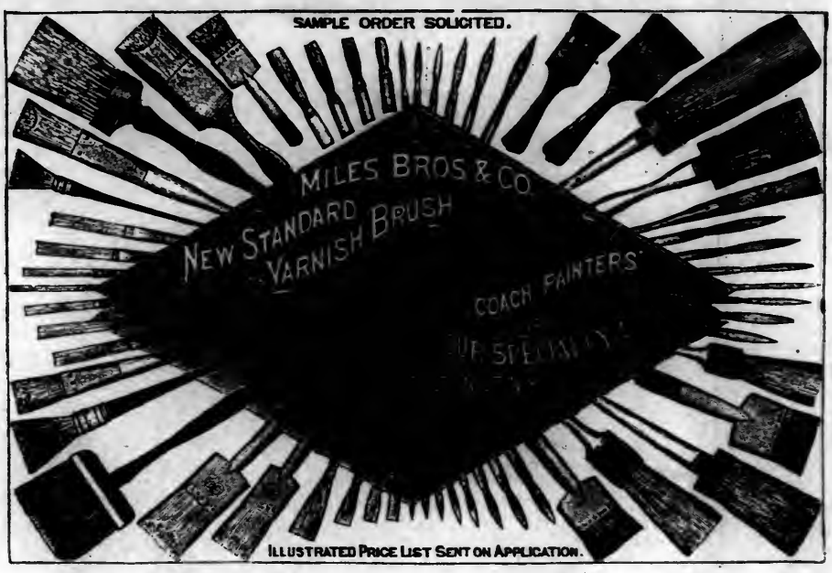
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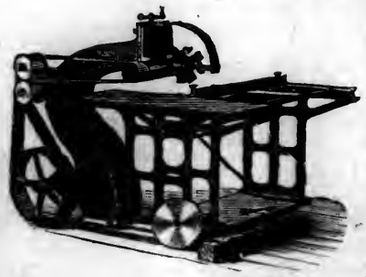
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